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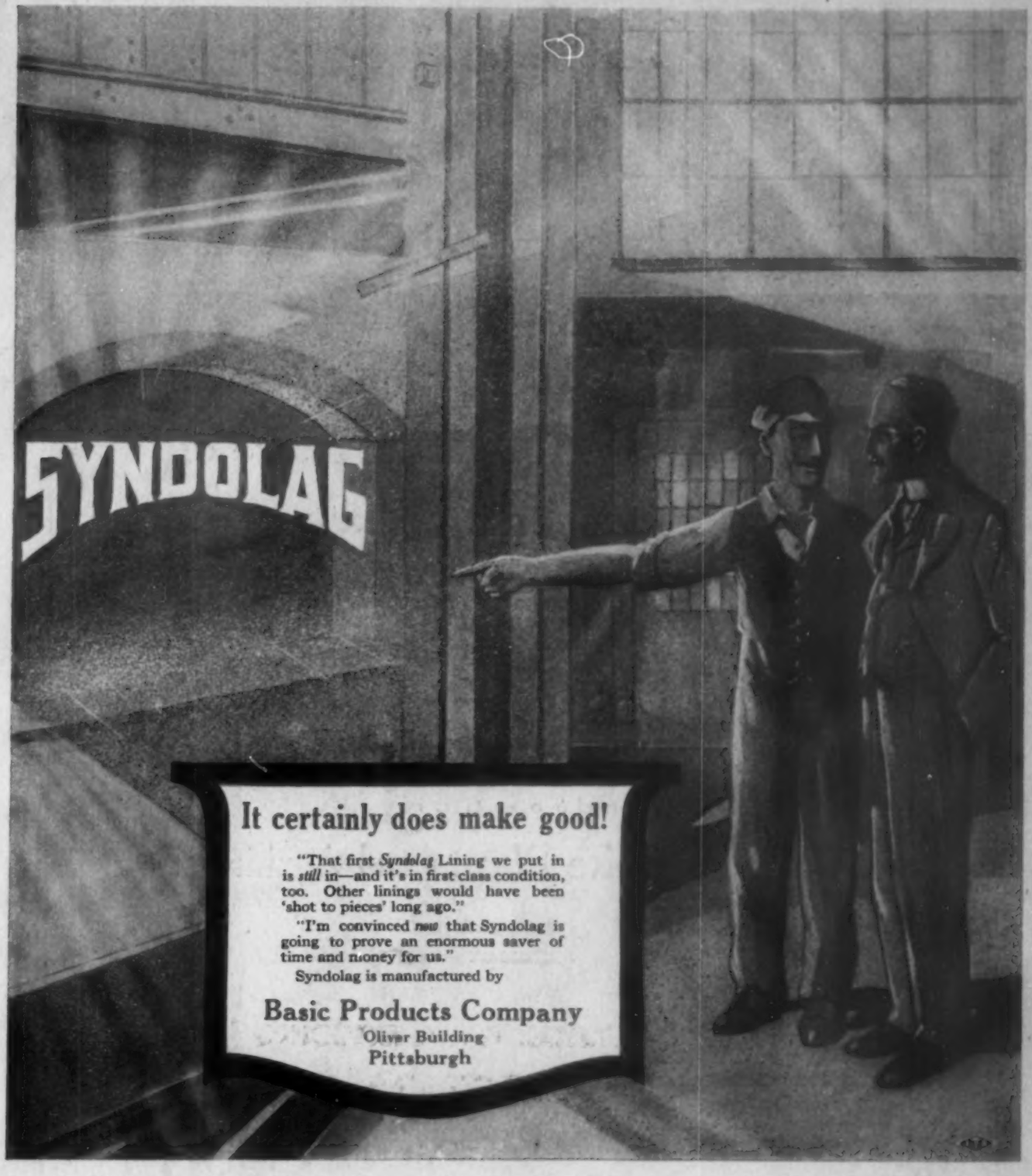
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PITTSBURGH, PA.

THE IRON TRADE REVIEW

Vol. LX Cleveland, January 18, 1917 *No. 3*

Undelivered Products Piled High

Railroad Congestion Growing Worse—Sales of Pig Iron for Export Limited by Vessel Conditions—Pennsylvania Railroad Will Not Buy Rails

TROUBLES of blast furnaces, steel plants and finishing mills increase, owing to the continued inability of railroads to give satisfactory service. An illustration of the unusual methods being adopted to keep plants of customers in operation is furnished by the action of the Detroit Iron & Steel Co. in buying 50 old freight cars which it is preparing for use in delivering pig iron in Detroit. Eastern furnaces find much difficulty in meeting contract obligations on account of reduced output and an unusual amount of misfit iron due to banking, which, in turn, has been caused by inability to obtain raw materials. At Pittsburgh, large tonnages of steel and finished products are piling up at the mills and conditions are steadily getting worse.

Pig Iron

Active inquiry for pig iron for export continues and a sale of 14,000 tons of bessemer at $35, furnace, has been made by a Cleveland company for export to France. Scarcity of vessel capacity and extremely high ocean-carrying charges are limiting the sales for export. A sale of 6,000 tons of bessemer has been made in the Pittsburgh district at $35, valley, which is the ruling quotation for furnaces, although this price has been shaded in some offers made by brokers. Owing to delayed deliveries by furnaces, the demand for spot iron has increased. Some users of standard low phosphorus have been compelled to go far from their usual source of supply to get iron for immediate use and sales at $57, delivered in the Philadelphia district, have been made.

Coke

Almost the only indication of improvement in railroad conditions is furnished in the coke market, where there has been some change for the better and prices of foundry coke dropped to $8 for prompt delivery, but very soon again advanced to $9.50. Furnace managers are not at all confident that better car service can be depended upon; in fact, some of them are now suffering on account of coke shortage.

Railroad Buying

The action of the Pennsylvania railroad in withdrawing its inquiry for 205,000 tons of steel rails for delivery next year was unexpected. While prices of rails were advanced $10 last year and are now quoted at $40 for open-hearth and $38 for bessemer, these quotations are at least $20 under the price of semi-finished material and other railroad companies have been buying freely. At the close of the old year, it was estimated that fully 1,000,000 tons of rails had been contracted for for 1918 delivery and foreign buyers were then and still are clamoring for large tonnages. A new car order for France may reach 42,500, of which number 3,000 have been placed. Italian state railways are inquiring for 4,000 cars. England is in the market for car material. The Chilean government has bought 5,000 tons of steel rails and the Andes Copper Co., 9,000 tons, both for next year's delivery, by the Steel Corporation. It is difficult now to buy rails for delivery before the middle of next year.

Foreign Buying

As prospects for peace have almost disappeared, the finished material market shows more activity and new business is increasing. The bookings of the Steel Corporation are in excess of shipments. Its operations are again becoming restricted by gas, coal and coke shortages and it is drawing upon its large stocks of pig iron and other materials. The allies are in the market for large quantities of shell forgings and miscellaneous products for the third quarter of this year and would buy large amounts of unfinished steel if it could be obtained.

Billets

The scarcity of semi-finished material is shown by a sale of a round tonnage of open-hearth rerolling billets for this year's delivery at $62.50, eastern mill, which is a new price in that part of the country. Inquiries for large tonnages of rounds for the manufacture of shrapnel are pending and buyers are finding difficulty in placing orders.

THE OPEN HEARTH

Daniels' Action Akin to Treason

THE ACTION of Secretary Daniels in seriously considering the bids of a British manufacturer of shells for the navy is highly reprehensible and unpatriotic and should result in his being driven from the cabinet.

In past years, there have been many kinds of dumping of foreign goods on American shores, but this attempt of the Hadfields is the worst ever recorded. The fact that a British company was able to bid a lower price than American manufacturers and insure earlier delivery is not at all remarkable, although it may seem so at first thought. While during the war there has been a tremendous use of shells in land battles, the British navy has so dominated the seas that it has seldom been necessary to fire a gun. Hence it was perfectly natural to accumulate a surplus of naval shells which the makers now find on their hands and are willing to dump on American shores with the assistance of the unamerican secretary of the navy.

No matter how cheap a politician a cabinet officer may be, or how desperately he may seek notoriety, it is difficult to imagine how he could turn his back on American manufacturers and favor those of a foreign country at a time when newspapers have repeatedly stated, on the highest authority, that the President is more strongly convinced than ever that the trend of events connected with the European war will make absolutely untenable the position of the United States as a nation at peace.

This action of Daniels is, however, in harmony with the general attitude of the present secretary of the navy toward patriotic manufacturers who have been doing their utmost to serve their country. Two years ago, for example, the Bethlehem Steel Co. took an order for 2,400 14-inch armor-piercing shells at a contract price of $768,000. Specifications of the navy department provide that the shells shall be of a certain size and that they must pierce armor plate at a certain velocity on impact. As the quality of the armor plate is not standardized, the manufacturer cannot know the exact conditions of the tests. The Bethlehem company had made large quantities of shells which had been accepted by the navy department, but in placing the particular order referred to for 14-inch shells, the department altered the angle at which the tested shells must pierce the armor plate. Officers of the department assured the company that the shells then being produced would meet the requirements of the new test, but this did not prove to be true. Neither the Bethlehem company nor any other American concern has been able to produce, in any quantity, shells which will meet the new test. One result is that up to the present time on the contract of $768,000 the Bethlehem company has been put to actual operating expense of $447,881 and has been penalized for non-delivery to the extent of $495,744, a total of $943,625, *a loss due to honest effort to serve the country.*

The bid of the English concern was for a specific shell, samples of which are being sent across the ocean for test, and if Mr. Daniels' officers are as particular in their tests of the English shells as they are when testing the American-made product, the Hadfield shells may not come up to requirements. President Grace, of the Bethlehem Steel Co., expresses the opinion that the requirements of the department on these recent contracts are absolutely beyond the development of the art of projectile manufacture. "Having been unable," he says, "after incurring liabilities of more than $1,000,000, to deliver shells on previous orders which would satisfy the department, the Bethlehem company saw no good purpose to be served by bidding at all on more 14-inch shells."

If the policy of the navy department is based on anything except desire to obtain notoriety, it is a determination to discourage private enterprise and to divert all work for national defense into government plants and the plants of foreign nations. The board of army officers and civilians appointed some time ago by Secretary of War Baker has presented a very able report in which the worse than folly of depending upon government plants in times of war is clearly set forth. The arguments and facts presented by this board are absolutely convincing to any fair-minded man. The crowding-out of private manufacturers in order to have work done in plants of the American government is not, in the language of the board, feasible or practicable.

To drive the American manufacturers out of business in order to give employment to plants of foreign countries is akin to treason.

Great Economic Waste

THE very important economic features of the mobilization of the national guard and its service in Texas are set forth in an extremely interesting manner in a report which has just been published by the mayor's committee on national defense, of New York City.

In reading this report, one cannot doubt the loyalty to their country of the men who enlisted, or of the employers who have expressed their opinions in response to the requests of the committee, but the weaknesses of the present system stand out in a glaring manner. One of the striking facts is that the economic loss of mobilizing the guard was much

THE OPEN HEARTH

greater than it might have been because many men with heavy family and business responsibilities and large producing power were enlisted when a far more than adequate number of unmarried men who had not attained high earning power might have been obtained for their country's service. The captain of a company in one of the New York regiments on the border who asked each of his enlisted men to make out an unsigned card as to his earnings in civil life developed that the average earnings were $218.25 per month. Undoubtedly the earnings of this particular company were much larger than the average of the soldiers on the border, but it is clear that there was no necessity for enlisting many men of high earning power. Even on the basis of $75 per month, the committee points out, the assembling of the 138,500 guardsmen who were in the federal service on Aug. 31, represented an annual loss to the country in productive capacity of $124,650,000. Wage statistics collected by national and state commissions indicate that the average earnings of youths of 19 are $275 a year. Hence, if the men in the service Aug. 31 had been of this class, the annual loss in productive capacity would be only $38,087,500, or less than one-third of the actual estimated loss. Extracts from letters from the guardsmen show very plainly that engineers, physicians, manufacturers, salesmen and others are now on the border at large financial loss, and in some cases families are suffering on account of their absence.

Letters from employers whose employes went into the national guard also disclose important facts and opinions. The president of a cable company states that as an employer he would be willing to give some time off with pay to employes of the younger type under the Swiss system to obtain military training each year. His position is that the duty of serving the country rests upon every man, especially in his youth, and that fundamentally he should be required to give at least at his own cost such time as the system adopted by his country requires of him without any compensation or participation by his employer, but employers also ought to show their patriotism by contributing a portion of the time of the young men in their employ. This position is, we believe, an eminently fair one. Certainly every young man owes some service to his country and should be willing to give it gladly. While, of course, the generosity of employers is to be commended, the present system, or lack of system, is unfair because some employers are called upon to make much greater sacrifices than others. We believe that employers with very few exceptions would be found ready to do their full duty and that the young men of the nation would also measure up to high standards and cheerfully do their important part.

Co-Operation the Watchword

WITH the subject of peace occupying a more prominent place in men's daily thoughts and in the public print, speculation has been sharpened as to the near future of the tremendous export trade in iron and steel which has come to this country more by chance than by design during the past two years. No thoughtful man can avoid the conclusion that the urgent call overseas for American iron and steel, both of a military and non-military character, has been one of the vital factors in the tremendous prosperity of the industry now evidently near its crest. Our direct shipments of iron and steel in 1916 reported on a tonnage basis will amount to about 6,000,000 tons. What the indirect export shipments of iron and steel in manufactured forms have been, cannot be hazarded, but they have been very large.

It has been largely under the press of this tremendously expanded demand from abroad that the estimated increase of 4,300,000 tons has been made during the past year to the country's open-hearth steel capacity, and construction of 4,800,000 tons additional has been started. Much of the latter will be ready for operation during the present year. Without the tremendous export trade, this impressive expansion of capacity, the greatest in years, would not have been undertaken. Domestic consumption by its natural growth could not be expected to absorb these enlargements for a long period.

The American iron and steel industry of the future will need, more urgently than ever before, a large and vigorous export trade, to insure prosperity. It will need the broader vision and spirit of enterprise which some of its leaders are showing. It will need essentially a more purposeful and intelligent co-operation on the part of the government. Greater still, it will need a more intimate co-operation by its own manufacturers both among themselves and with other powerful branches of American commercial life, so that the burdens and responsibilities of foreign trading may be distributed not over a firm, but over many companies.

The prospect of any kind of co-operation between the government and manufacturers is, however, very discouraging at the present time. With such a man as Daniels in the cabinet and such a man as Hurley going out of public service, the prospect of business men getting anything like fair treatment at the hands of the government is not favorable. If, however, the President will kick Daniels out of the cabinet and fill the vacancies on the federal trade commission with the right kind of men, a vast amount of good can still be accomplished.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 17, average for December, 1916, average for October, 1916, and average for January, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Jan. 17, 1917.	Aver. for Dec., 1916.	Aver. for Oct., 1916.	Aver. for Jan., 1916.
Bessemer pig iron, Pittsburgh...	$35.95	$35.95	$24.325	$21.32
Basic pig iron, Pittsburgh.....	30.95	30.95	20.825	19.20
No. 2 Fdy., pig iron, Pittsburgh	31.95	31.70	21.075	19.95
Northern No. 2 Fdy., Chicago..	31.00	29.25	19.15	18.50
Lake Superior Charcoal, Chicago	33.75	32.00	20.40	19.25
Malleable, Chicago	31.00	29.25	19.50	19.00
Southern No. 2, Birmingham...	23.00	23.00	15.13	14.50
Southern Ohio No. 2, Ironton...	30.00	30.00	19.38	18.00
Basic, eastern Pa.....	30.50	30.00	21.00	19.50
No. 2X Virginia furnace.....	27.00	26.00	18.50	17.25
No. 2X foundry, Philadelphia...	30.50	29.50	20.50	19.75
Ferro mang., Balti.....	164.00	160.00	160.00	110.00
Bessemer billets, Pbgh.....	62.50	58.75	45.75	33.75
Bess. sheet bars, Pbgh.....	62.50	58.75	45.75	33.75
Op.-h'th sh. bars, Pbgh.....	62.50	58.75	45.75	34.75
Open-hearth billets, Pbgh.....	62.50	58.75	45.75	34.75
Steel bars, Pittsburgh contract...	3.00	2.925	2.60	1.86
Steel bars, Chgo.....	3.19	3.10	2.80	2.03
Iron bars, Philadelphia.....	3.159	3.059	2.659	2.259
Iron bars, Cleveland, local del'y.	3.00	3.00	2.55	2.00
Iron bars, Chgo mill.....	$3.00	$2.85	$2.35	$1.83
Beams, Chgo. contr.....	3.29	3.20	2.80	2.03
Beams, Pittsburgh, contr.....	3.10	3.025	2.70	1.86
Beams, Philadelphia	3.409	3.409	2.859	2.159
Tank plates, Pbgh., contract.....	3.60	3.525	3.00	1.87
Tank plates, Chicago, contract...	3.79	3.75	3.19	2.05
Tank plates, Philadelphia.....	4.659	4.159	3.909	2.409
Sheets, blk., No. 28, Pbgh.....	5.00	4.50	3.225	2.58
Sheets, blue anl., No. 10, Pbgh..	4.50	4.00	3.125	2.45
Sheets, galv., No. 28, Pbgh.....	7.00	6.25	4.45	4.75
Wire nails, Pittsburgh.....	3.00	3.00	2.62	2.12
Connellsville fur. coke, contr...	8.00	4.44	3.37	2.38
Connellsville fdy. coke, contr...	6.50	6.00	4.87	3.75
Heavy melting steel, Pbgh.....	23.00	25.00	17.87	17.50
Heavy melting steel, eastern Pa.	21.00	24.00	15.75	16.75
Heavy melting steel, Chgo.....	20.56	23.37	16.50	15.50
No. 1 wrought eastern Pa.....	27.00	27.00	22.00	22.25
No. 1 wrought, Chgo.....	23.00	25.37	17.50	15.50
Rerolling rails, Chgo.....	27.00	29.50	18.75	17.70
Car wheels, Chgo.....	20.00	21.87	12.25	14.75

(For Additional Prices See Page 232.)

France Active as Buyer of Pig Iron

Cleveland Company Sells 14,000 Tons for Export—Foreign Transactions Limited by Scarcity of Vessel Capacity and Extremely High Freight Rates

Pittsburgh, Jan. 16.—The domestic market for pig iron continues quiet. Enough tonnage has been sold this week, however, to indicate that prevailing prices are being firmly maintained. A consumer in this district has closed for 6,000 tons of bessemer iron for shipment the second and third quarters at $35, valley. Reports of iron being offered at slightly less than that figure are heard in isolated instances. Basic pig iron is being held at $30, valley.. No. 2 foundry and malleable irons are selling at $32 and $33, valley, although the $31 figure, for extended shipment, has not entirely disappeared.

During the initial week of the year, shipments of coke improved appreciably, but a heavy fall of snow on Sunday blocked railroad traffic in western Pennsylvania to a considerable extent. The Carnegie Steel Co. has banked nine blast furnaces on account of the slow movement of fuel, and other stacks likely will be banked unless shipments of coke become better.

More Demand for Spot

Philadelphia, Jan. 15.—Reduced output of the furnaces caused by recent difficulties of operation continues to more than take up any slack in new buying of pig iron in eastern territory and the market is being kept exceedingly tight and strong. Loss of product through banking or misfit casts is causing makers to exert themselves to the utmost to fill their obligations since buyers are pressing hard for deliveries. The former consequently are not much concerned with new sales. Some makers are following the policy of distributing their output to those consumers most in need. Buyers unable to fill their requirements against their regular contracts are shifting to other furnaces. This continues to produce an increasing demand for spot and early iron in moderate lots. The Pennsylvania railroad was one of the buyers to come out for spot iron in the week and it closed for several hundred tons of high manganese foundry. Some demand for charcoal iron for immediate shipment has developed and sales have been made at $36.84, Buffalo.

Some users of the standard low phosphorus iron are sorely pressed for early shipments. A large eastern Pennsylvania consumer was obliged to go to the Milwaukee district to obtain spot iron. A sale of 500 tons was made for delivery outside this district at the equivalent of $57, Philadelphia, and some lots for local shipment were made at the same price. One maker sold about 1,500 tons in the week. A Lebanon maker of low phosphorus sold 500 tons of March iron for export at $55, furnace, and quoted the same on 500 tons more.

Philadelphia sellers have had an 8,000-ton basic inquiry from a Canadian steel foundry and it is understood this business has been placed with Buffalo makers. There is no local basic inquiry. Eastern Pennsylvania furnaces have little iron of any grade to offer at present and a similar condition obtains in Virginia. Furnace prices are from $30 to $32 for No. 2X in eastern Pennsylvania, and from $27 to $28 in Virginia with some makers asking $29. Operating conditions are better than they were, but still serious. The Iron Gate, Va., furnace has been banked.

Selling Half of Make

Birmingham, Ala., Jan. 16.—The lull in the pig iron market in the

(For complete prices see page 232.)

south is not nearly as pronounced as it might be. Sales of iron are being made, though in small lots and scattered over the entire year as to delivery. The estimate is made that sales are aggregating about 50 per cent of the probable make, but practically no effort is being made to get more business, so much iron having been sold ahead and certain grades not being so plentiful for the first half of the year. The Sloss-Sheffield Steel & Iron Co. one day during the past week sold a hundred or more tons than was produced that day at its several blast iron furnaces. Quotations for pig iron continue firm, around $24 per ton, No. 2 foundry or basic.

Pig iron production in this section is being maintained at maximum, and first two weeks' output indicates there will be an appreciable increase for the month in comparison with the figures of December. Raw material supplies are more plentiful. In some directions there has been need for limestone but additional quarries will resume this week and these demands will be met. The scarcity of coke is again felt. It was noted a week ago that the situation as to this product was easing up, but complaint is heard again that there is not any surplus.

Foundry Iron to Canada

Cincinnati, Jan. 15.—A Canadian melter has purchased 1,500 tons of southern foundry iron for delivery over the last half of next year, and a Michigan user has taken 500 tons of southern Ohio silvery iron for the same shipment. These are the only recent sales of importance. Inquiry is low and limited to small lots. Specifications for delivery on old contracts are heavy, and railroads are not able to ship iron as fast as it is needed. Embargoes by southern roads are easier, but their equipment is not sufficient to carry all of the iron consigned to them at the times specified. Dealers do not expect the market to change during the coming week. Southern No. 2 foundry continues from $23 to $25, Birmingham basis, for 1917 delivery. Southern Ohio No. 2 foundry is holding at $30, Ironton basis, and southern Ohio silvery at $36, furnace, for 8 per cent silicon, both for last half shipment.

Bessemer for France

Cleveland, Jan. 16. — A Cleveland company has sold 14,000 tons of bessemer pig iron for export to France at $35, furnace, delivery to be the first three months of this year. The same company has sold 1,000 tons of No. 2 foundry for last half at about $29.50, furnace.

Although the pig iron market cannot be described as active, there is considerable inquiry for prompt delivery and some sales are being made. Southern iron is coming into the Cleveland market at $29, delivered, which is about $1 lower than the usual furnace price at Cleveland. As an indication of the strength of the market, a sale of off-iron by a lake furnace may be cited. This iron was so high in sulphur that in ordinary times no attempt would be made to sell it, for it would be remelted in the furnace, but no difficulty was experienced a few days ago in selling the iron at $30, furnace. Blast furnace operators are finding great difficulty in making deliveries and some of them are resorting to extraordinary methods to keep their customers supplied with iron.

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Moving Slowly

St. Louis, Jan. 15.—Pig iron is moving slowly in this district, and agents are not looking forward to any improvement in the near future. Inquiries in the market do not exceed 1,500 tons, including one for 300 tons of No. 1 northern foundry, another for 1,000 tons of southern No. 2. Last week was decidedly off so far as sales were concerned, but prices are stiff at $25 for southern No. 2, Birmingham basis, for any delivery. Northern iron is firm at $30, Chicago.

Buffalo Stacks Sold Up

Buffalo, Jan. 16.—Producing interests of the Buffalo district face an increasing inquiry for iron of various grades for delivery, largely over first half, but have practically nothing to sell. The stacks of the district are virtually sold up over the remainder of the year, as far as large tonnages are concerned. One interest has nothing available and is declining to quote on inquiries coming in, even for long established customers.

The only movement of any extent at the present time is where the producing interest has scoured other sources of supply and some of them remote, to pick up here and there enough iron to make up the tonnage allotments sought by consumers to cover their urgent needs. Considerable of the foreign iron assembled in this way to make up an order, even of 500 tons or so, is southern iron.

The tension between the sold-up Buffalo producers and their customers, the melters in many cases needing iron for urgent and immediate consumption, is being strained to a greater degree by the enforcement of embargoes, in the effort of the railroads to overcome the car shortage situation.

The price situation remains unchanged. The nominal asking price, irrespective of grades or deliveries, holds at $35 flat, at the furnace. It is a higher figure than prevails in other producing centers that are not sold up to the extent of the Buffalo district stacks. It is virtually a stop-sale price, and but little iron has been booked at the price except in the case of some orders for steelmaking irons and certain charcoal grades, the latter being quoted here at $35.50 to $36.

The bulk of the iron being produced at present by Buffalo stacks in filling orders previously taken is being billed to consumers at $20 to $30 per ton at the furnace, according to when the orders were booked during the recent advances recorded as the stacks sold up under pressure from consumers.

Very High Vessel Rates

New York, Jan. 16.—Export inquiry by a wide margin continues to represent the chief branch of new business activity in the local pig iron market. The number of new sales for foreign delivery, however, remains very few. Scarcity of vessel space and prohibitive rates are effectively restraining the development of new business. Ocean freights to those countries which have been the most active buyers of iron have jumped so that they are practically out of reach and since available room is so small, quotations largely are nominal. To Italy, $50 per ton is mentioned, but over $60 has been named. To France, $55 has been quoted, with $60 talked of. The last booking to Scandinavian countries were at $35, but it is questioned whether this could be duplicated to-

(*For complete prices see page 232.*)

day. Among the new export inquiries this week are 10,000 tons of 0.04 phosphorus for June-July; 1,000 tons of March bessemer and 500 tons of early low phosphorus, all for Italy; 2,000 tons of foundry for Holland; 1,000 tons of the same grade for Sweden and 1,500 tons of bessemer for France. The last inquiry is distinct from the negotiations for a round tonnage of bessemer being carried on by the French government, which are continuing. An eastern furnace company may close with these buyers soon for a heavy block of this business. An offer on 2,000 tons of bessemer for Italy has been withdrawn because freight room could not be had. The Canadian Steel Foundries have bought basic from Buffalo makers against a recent inquiry for 8,000 tons at a reported price of $35, furnace. Only a few small inquiries are stirring from domestic buyers and there are practically no sales. Prices retain their strength, however. Buyers are insisting on active shipments.

Chicago Market Quiet

Chicago, Jan. 16.—Neither buyers nor sellers of pig iron are active in the Chicago market. Buying for second half has been done only in small tonnages and recently comparatively little business has been placed for that delivery. It is expected that before long a buying movement will develop and the output for the last half be well covered. The quotation on northern iron continues at $31, furnace, and in some instances with other considerations attached malleable has been contracted at $32, furnace. Lake Superior charcoal iron remains steady with small demand and comparatively few new contracts.

Southern iron is equally quiet and comparatively little is being sold except some resale iron, which has been disposed of at $23, Birmingham. Some second half iron is available at $23 to $25, Birmingham, but most makers are not willing to take further business for that delivery. A western maker of ferro-manganese is quoting $175 to $185, furnace, and could contract for a much larger tonnage if the capacity of its furnace was sufficient.

English Market Firm

Birmingham, Eng., Jan. 1.—The New Year opens with pig iron showing a great degree of firmness. It is some months since the Birminham market was so solid as at the last meeting of the old year. Makers were able to claim full prices even for common irons, which they had not been able to do for several months past. Some authorities speak with confidence of the minima being lifted in the New Year, but it would seem that a much stronger feeling in favor of this course will be necessary if trade opinion is to have a practical effect upon the ministry of munitions. At least a fair proportion of the makers are entirely averse to any application for price advances.

The efforts to increase production are now beginning to bear fruit, and it is hoped that arrears of orders will soon be overtaken. It is considered a good sign that the control committee is somewhat more liberal in permitting forward business, but care is taken not to exceed real needs as far as they can be estimated. Mixed numbers of East Coast hematite continue unchanged at 122s 6d ($29.40) to controled consumers, 137s 6d ($37.80) to France, and 142s 6d ($34.20) to Italy. It is believed that conditions will be somewhat easier in the matter of supplies during the New Year, owing to a substantial increase in production. But this hope will only materialize if the government refrains from large demands for men for recruiting purposes. It is obvious that great liberties cannot be taken in this direction, if supplies are to be maintained. In South Wales the whole of the hematite production has been secured for government purposes. In the west of England, where the high-class hematites are called for to an enormous extent for war purposes, demand is still far in excess of supply, but in that district also, elaborate arrangements are being made to increase the output, and it is hoped this will soon relieve the present great pressure.

Coal Prices Named

Pittsburgh, Jan 16.—Several consumers of bituminous coal have bought fuel for shipment in the year begininng April 1, next, at prices ranging from $2.75 to $3.50 a ton at the mine for run of mine coal. The bulk of the tonnage for shipment in the 12-months period, beginning April 1, likely will not be purchased for 30 days. For shipment up the lakes, operators will obtain prices approximating those for delivery to the line trade. Bituminous coal for spot shipment is commanding from $4.50 to $5 a ton for run of the mine. Slack for future delivery has sold at $2.25 to $2.50 a ton.

B. & O. Embargo

The Baltimore & Ohio railroad has placed an embargo on all freight, excepting perishable goods, food, government orders and coke, on the lines west of Pittsburgh. The embargo was issued because of the congestion between Pittsburgh and Chicago.

The Boss Mfg. Co., Kewanee, Ill., has increased its capital stock from $1,750,000 to $2,500,000.

(*For complete prices see page 232.*)

Sheet Mills

Are Seriously Handicapped by Shortage of Cars

Youngstown, O., Jan. 15. — The production and sale of sheets in the Mahoning valley this week are predicted, as they have been in greater or lesser degree for weeks past, upon two outstanding factors: production upon the freight situation and the market upon the degree of anxiety to buy.

Little, if any, tonnage of black sheets is being sold at less than 5c, and the quotations run to 5.50c; blue annealed brings from 4.25c to 4.75c; galvanized is quoted at the wide range of 6.50c to 7.50c. All the grades are in strong demand, both from foreign and domestic sources.

The hardest problem of the finishing mills continues to be the job of producing shipments of enough material of production to keep running. Some of the larger mills are operating at nearly full time; others are working at from 60 to 80 per cent of their capacity.

The fuel problem again is approaching the acute stage. Both its price and inability to get enough of it at any price may cause several shutdowns before the end of the week.

Most of the plants are getting hardly more than from 60 to 70 per cent of the cars they need for shipping the finished material to their customers. On the whole, the freight situation, while it may be a little better than it was before the holidays, is not substantially improved.

The sheet makers still face difficulty in getting enough bars, even at altitudinous prices, to feed their mills. Conditions in their respect perhaps are not as bad as they were, but nobody's yards are cluttered with semi-finished.

Cold Rolled Strip Steel

Pittsburgh, Jan. 16. — Manufacturers have not opened books for shipment in the second quarter of 1917, although mills have enough tonnage on hand to enable them to operate at maximum capacity through the first half. Additional contracts likely will be accepted just as soon as mill managers know what prices they will pay for billets for shipment in the second quarter of the year.

Nuts, Bolts and Rivets

Pittsburgh, Jan. 16.—Further advances in prices of nuts, bolts and rivets appear to be imminent. Demand for all three products is heavy and considerable new buying is enjoyed. Car and ship builders continue to specify briskly.

The Union Electrotype Foundry, Chicago, has increased its capital stock from $5,000 to $30,000.

Billets Sold

At $62.50 for Rerolling, While $65 is Asked for Slabs

Philadelphia, Jan. 15.—A round tonnage of ordinary open hearth billets for rerolling purposes has been sold by an eastern maker at a new high price of $62.50, mill. This steel is for delivery beginning at an early date and practically takes this producer out of the market for many months. A middle-western munition maker this week inquired of eastern mills for 10,000 to 12,000 tons of large rounds or squares for 1917 delivery, but could not draw a quotation, as the producers have little, if any, material for sale throughout the present year. The leading eastern sellers of billets normally are quoting $60, mill, for open hearth rerolling billets and from $75 to $80, mill, for forging steel. The new inquiry is good. Some buyers are beginning to ask about 1918 positions. A middleman sold 1,500 tons of wire rods for export, delivery in September-October, at $79, tidewater, and has 1,000 tons additional under negotiation. Early rods command $85 or more, tidewater. One maker recently sold at $87.50, mill. A recent inquiry from Italy called for 8,000 tons of rods. This form of semi-finished steel is much sought from abroad.

Premiums Offered

Pittsburgh, Jan. 16.—Heavy demand exists for billets and sheet bars for shipment the first and second quarters of this year, but manufacturers in this district are not in a position to meet specifications for additional tonnages. Both products are quoted at $60 to $65, mill. According to some people, the latter figure cannot be shaded. Many consumers who covered estimated requirements before the close of 1916 are offering premium prices for additional tonnages for delivery before April 1. Muck bar is held at $50 and wire rods at as high as $80 a ton, at the mill.

Inquiry Goes Begging

Cleveland, Jan. 16.—An inquiry for 45,000 tons of 6-inch shrapnel rounds has been made in New York City and locally within the past week. The steel is to be to English specifications, and the inquiry calls for delivery over 1917. The buyer has had difficulty in securing either favorable prices or reasonable delivery.

A Pittsburgh broker has quoted a Cleveland buyer $65 on bessemer slabs, but the offer was not accepted. The quotation is taken, however, as an indication of the great strength of the market.

High Price for Sheet Bars

Youngstown, O., Jan. 15.—The seeker after a hotel room in convention time is not a more pathetic figure than he who comes to this territory to buy sheet bars. He has the same range of chances as the traveling man and according to his former regularity as a customer.

The whole valley may be said to be almost out of the market for anything like prompt delivery or first half business, and the manufacturers are reluctant about opening their books for much business beyond. It is doubtful whether bars can be bought here for less than $65; higher prices have been quoted and accepted, in a few cases beyond $70 if the need was imperative.

Shortage of fuel and inability to get sufficient cars continue to curtail production.

Steel Bars Strong

Little Business Owing to Sold-Up Condition of Mills.

Philadelphia, Jan. 15.—One large independent maker continues to offer deliveries on steel bars in from 60 to 90 days on the average and is making sales regularly at from 3.25c to 3.50c, Pittsburgh. Buying, however, is small, as most of the consumers and jobbers are covered by first quarter contracts. Some of the makers continue to keep out of the market as sellers for delivery by July because they are short on steel and they do not care to quote beyond that date. There are reports of price irregularity in shafting where 20 off is said to have been done by one or two makers, against the usual price of 10 to 15 off.

Demand Active

Pittsburgh, Jan. 16.—Manufacturers of steel and iron bars say demand is as insistent as ever. Steel bars are selling at 3c for delivery at the convenience of the mill and iron bars are commanding 3.25c and above. Virtually all the bar steel tonnage sold at less than 2.25c has been shipped; some mills now are rolling material sold at 2.50c.

Steel Bars Strong

Chicago, Jan. 16.—The situation in soft steel bars practically is that no new business in this product can be placed with the larger makers who are sold up for their entire output through the present year. The nominal quotation is 3.19c, Chicago mill, but in the occasional instance, where business is placed for prompt delivery with smaller mills, considerable premium over this figure is gladly paid by the consumer.

Some rerolling mills recently have been producing bars from crop ends, which are of odd analysis and would not class with regular soft steel bars, but are perfectly good for many purposes. For these they have been receiving as high as 3.25c, Chicago, for prompt delivery.

Hard steel bars rerolled from rails are held at 3c, Chicago, and makers are not willing to sell a larger tonnage then can be rolled from rails already in their yards, as the supply of this material has been uncertain. However, the situation as to rerolling rails is improving and more of this material is being obtained.

Quickened Interest

Buffalo, Jan. 16.—The quickened interest in mill products is particularly noticeable regarding bars and small shapes. Some sales have been booked with delivery subject to mill's convenience at 3c, base. Offers on the part of sales agencies to cover customers' needs under contract for second quarter at several dollars per ton over the prevailing market are reported.

Bar Iron Strong

Chicago, Jan. 16.—With most producers of bar iron sold ahead much farther than is their custom, the bar iron market is strong and new contracts are difficult to place. Some mills are sold practically through first half, while others have reserved some tonnage to care for requirements of their customers later. The nominal quotation is 3c, Chicago, with occasional contracts being made at 3.10c, Chicago.

Considerable inquiry is being made, but for the most part this is not being acted on by ironmakers.

Shafting Prices Harden

Pittsburgh, Jan. 16.—Prices of cold rolled steel shafting continue to harden. Most mills are asking 15 per cent off the list and the 20 per cent off the list price practically has disappeared. Deliveries show improvement; at least one mill is in a position to promise shipments within 60 to 90 days.

Hoops and Bands

Pittsburgh, Jan. 16.—Prices of hoops and bands show no change. For delivery at the convenience of the mill, hoops are quoted at 3.50c and bands at 3c. For shipment in the second quarter, some mills are obtaining $10 a ton above those prices.

(*For complete prices see page 232.*)

Coke Sags

And Then Advances—Decided Shortage of Cars

Pittsburgh, Jan. 16.—The price of Connellsville blast furnace coke for spot delivery dropped to $8 a ton on Monday, but climbed back to $9.50 a ton today. Several sales at that figure were reported today and it is likely that even higher prices will come out before the end of the week. The supply of railroad cars is extremely low, and unfavorable weather conditions have tended to complicate the general traffic situation. The Carnegie Steel Co. banked nine blast furnaces, on account of an unsufficient supply of fuel. The market for foundry coke reflects moderate strength, but is not active. The market for contract furnace and foundry coke is almost at a standstill. *The Connellsville Courier* says the production of coke the week ending Jan. 6 was 358,576 tons, compared with 331,911 tons the week before.

Coke Famine Closes Foundries

Chicago, Jan. 16.—The coke situation seems to be becoming worse in some respects and two small stacks have been forced to bank recently until a further supply could be obtained. The smaller stack at the plant of the Wisconsin Steel Co. has lost some time for this reason, and a small stack at Milwaukee has also been out of commission a fortnight.

While a number of small foundries depending on coke hauled from cars on team tracks have been closed from time to time, a number of larger foundries recently have been unable to operate and instances have been known where anthracite coal and coke have been used in cupolas. One foundry of considerable size recently used a motor truck to haul coke from South Chicago to its north side foundry, a distance of many miles in the effort to keep running while coke on cars could not be placed on its side track owing to the car congestion.

Lower Prices

Philadelphia, Jan. 16.—An easier condition in the coke market is reflected by the transactions in eastern territory during the week, and lower prices have been done for spot delivery. A number of cars of spot Connellsville furnace coke were sold to eastern buyers at $8.50, ovens, and there also were sales at $8.85 and $9, ovens, respectively. These sales covered about 50 cars. High grade Latrobe furnace coke has been offered to eastern consumers at $8.50, at the ovens. An eastern blast furnace interest which is planning to start an idle stack has inquired for 15,000 tons of coke monthly for six months beginning about mid-year.

Shipments Delayed

Cincinnati, Jan. 15.—Sales of coke are light, but dealers are still experiencing considerable difficulty securing satisfactory shipments on contracts. Embargoes by railroads are much easier, but their equipment is insufficient to supply demand. One Wise County operator has advanced the price of foundry coke to $7.50, ovens, for 1917 delivery, and is not offering any special price for first half shipment. Pocahontas foundry coke can be had at $6, ovens, for shipment over the entire year or the first half. No prices are out for furnace coke.

Cast Iron Pipe

Prices Are Being Maintained, But Market is Dull

New York, Jan. 16.—Prices on cast iron pipe in eastern territory have been holding firmly despite the light new buying, but signs of sharp competition developed in a letting during the week of 2,600 tons by the city of Boston and the established schedule was cut $3 to $3.50, per ton, by some makers. There were some special features in connection with the contract. R. D. Wood & Co. were the low bidders at $42.49, delivered, for the 4's; $39.49 for the 6, 8 and 10's, and $38.48 for the 12 and 16's. Baltimore is taking bids on several thousand tons but is buying only for its first half needs instead of for the full 12 months as customarily. Few municipalities are buying, and the new purchases of water and gas companies also are light. Makers are bidding on some export inquiries but sales are exceptional.

Mr. Wendell's New Position

Carl A. Wendell, for several years past steam engineer and engineer in charge of experiments at the Joliet works of the Illinois Steel Co., has been appointed chief engineer of the American Ore Reclamation Co., according to an announcement from that company's New York office.

Mr. Wendell formerly was secretary of the coal washing committee of the United States Steel Corporation and at various times has been an engineer in the service of the Corporation at several of its larger works. He has been connected also with the Dominion Iron & Steel Co. of Canada, the Lackawanna Steel Co., and was at one time in the steel business at Monterey, Mex.

The Kauffman Metal Parts Co., Bellefontaine, O., put its new plant in operation Jan. 8.

Ferro is Firmer

Higher Prices on Domestic Product for Early Delivery

New York, Jan. 16.—Some stiffening of the market on ferro-manganese for early delivery is in evidence, and higher prices have been obtained and are being quoted in some instances. This strengthening of the market necessarily applies to the domestic product since there is no early English metal obtainable except such small lots as are in the hands of middlemen. It follows from the continuing inquiry in fair amount for quick delivery from consumers who have not been receiving shipments from abroad in accordance with contract deliveries. An eastern steel works producer this week quoted $175, furnace, net to himself, on 150 tons for shipment over the first quarter. Carload sales at $175, furnace, also are noted. Some makers have been asking $180, delivered. The domestic price has been $175, delivered. About 2,000 tons of inquiry, all of it for shipment before July, are in the market. English makers continue unable to make any new quotations except for some months distant and they report few sales. Prices remain unchanged at $164, seaboard.

Spiegeleisen has become more active and is stronger. An Ohio steel maker bought 800 tons for shipment over the greater part of the year at slightly under $60, delivered. An eastern steel maker is in the market for 1,000 tons for eight months' delivery; a buyer in the Pittsburgh district, for 300 tons for second quarter; an Ohio river user for 200 tons for early shipment. Some export inquiry also is pending. Prices are firm at $55 to $60, furnace, for 20 per cent. The list of domestic producers of spiegeleisen is to be increased Feb. 1 when the Temple, Pa., furnace of the Seaboard Steel & Manganese Co. will begin to manufacture this alloy. The Algoma Steel Co., Sault Ste. Marie, Ont., also is preparing to produce this metal.

Extreme scarcity still marks the 50 per cent ferro-silicon market, as makers have nothing to offer. The question pertaining to the power requirements of those makers in the Niagara Falls district still is unsettled. Some consumers are reported to be hard pressed by shortages, and one of them is said to have offered for spot a price far over the nominal quotation of $100, Pittsburgh, but this was declined. France is in the market for 500 tons of bessemer ferro-silicon.

Louis S. Hall, 1607 Kresge building, Detroit, has been appointed sales agent for the Steel Improvement & Forge Co., Cleveland, and will cover the state of Michigan.

(*For complete prices see page 232.*)

Bridge Builders

Elect C. D. Marshall President and Give Testimonial

C. D. Marshall, of the McClintic-Marshall Co., Pittsburgh, was elected president of the Bridge Builders' and Structural Society at its annual meeting held at the Waldorf-Astoria, New York, Friday, Jan. 12. The other officers chosen were: Thos. Earle, of the Bethlehem Steel Bridge Co., South Bethlehem, Pa., vice president, and Harry Fuller, King Bridge Co., Cleveland, treasurer. An executive committee of six members was elected for the year. The appointment of secretary will be made at the next meeting of the executive committee.

Reports from officers and members at the meeting showed that while the year 1916 has been fairly satisfactory, it was not abnormal, either as to quantity of business or profits. Most of the members entertained optimistic feelings for the coming year. It was the consensus of opinion that there is small likelihood of a decline in prevailing prices for structural material for some time to come.

The annual dinner of the society following the meeting was attended by 44 members and guests. An instructive address on "Export Trade" was given by Wm. H. Knox, of Wm. H. Knox & Co., New York City. In commemoration of the six years of service, he has rendered the society, President Marshall was presented a beautiful silver pitcher and tray. The presentation was made by Mr. Earle. Other remarks were made by Arthur J. Eddy, of Chicago, counsel of the society; C. Edwin Michael, of Roanoke, Va., G. H. Blakeley, of the Bethlehem Steel Bridge Co., and by President Marshall.

Death of Chas. C. Ramsey

Charles Cyrus Ramsey, president of the Crucible Steel Co. of America, Pittsburgh, died Jan. 11 in the Allegheny hospital, that city, following an attack of pneumonia contracted five weeks previously. He had been identified with the crucible steel industry since 1885.

Mr. Ramsey was born in Allegheny City, Feb. 25, 1862. He started his business career as a stenographer for Charles L. Cole, assistant general freight agent of the Pennsylvania company. When 23 years old he left the employ of the Pennsylvania company, to accept a stenographic position in the office of Park Bros. & Co., Ltd., Pittsburgh, said to be at that time the largest manufacturer of crucible steel in the United States. Subsequently, he was appointed manager of the Philadelphia branch of the Park interests. A short time later, he was transferred to New York as representative of the company in charge of the eastern territory. Mr. Ramsey remained in New York until 1900, when the Park Steel Co., the successor to Park Bros. Co., Ltd., was absorbed by the Crucible Steel Co. of America, the organization of which was completed in that year.

Upon the retirement of R. E. Jennings, who had charge of the eastern territory for the Crucible company, Mr. Ramsey was appointed fourth vice president and manager of the eastern office. He returned to Pittsburgh in 1910, following the death of Frank B. Smith, president of the Crucible company. For about seven months Mr. Ramsey served as

CHARLES C. RAMSEY

assistant to Herbert DuPuy, who acted as president of the company during that period. In July of 1910, Mr. Ramsey was elected president of the Crucible Steel company, and later of its affiliated companies.

Ellis J. Hannum, secretary of the Newton Machine Tool Works, Inc., Philadelphia, died Sunday, Jan. 7. Mr. Hannum had not been in good health for several years, but was confined to his home only a week. He entered the employ of the company as a boy and had been in its service 29 years. In the very beginning, he exhibited exceptional natural talents for free-hand sketching, drawing and similar work and a preference for the drafting and engineering departments, in which he progressed rapidly. During the past two years his failing health caused him to relinquish his active duties.

Many Register

And Will Attend National Foreign Trade Convention

Approximately 1,000 delegates have registered for the national foreign trade convention, which will be held at Pittsburgh, Jan. 25, 26 and 27, at the William Penn hotel. Since more than 150 local delegates plan to take part in the program, it is likely that the attendance will exceed 1,000 men. James A. Farrell, president of the United States Steel Corporation, national chairman, will call the convention to order Thursday morning.

Robert Garland, president of the chamber of commerce of Pittsburgh, has been appointed honorary vice president of the convention. J. Rogers Flannery, chairman of the foreign trade commission of Pittsburgh, who is the director of the national board, will deliver the address of welcome. John D. Ryan, president of the Anaconda Copper Co., and E. N. Hurley, president of the federal trade commission, will be the principal speakers at the banquet, Jan. 26.

A special feature will be the offer of optional tours to the basic industries of Pittsburgh on Friday afternoon, Jan. 26. Arrangements have been completed for four special trains to be run respectively to the plants of the Edgar Thomson Steel Works, the Westinghouse Electric & Mfg. Co., the American Window Glass Co. and the Montour mine of the Pittsburgh Coal Co. Luncheon will be served on each of the special trains. Women attending the convention will take an automobile trip to the plant of the H. J. Heinz Co., where lunch will be served, after the plant has been inspected.

Special convention trains will be run to Pittsburgh from San Francisco, Chicago and New York. Large delegations will go to the convention in special cars from Cleveland, St. Louis and other points. The United States government will be represented by Dr. E. E. Pratt, director of the bureau of foreign and domestic commerce, and a corps of foreign trade experts.

The Pittsburgh executive committee consists of J. Rogers Flannery, chairman; E. M. Herr, H. P. Bope, F. F. Nicola, W. S. Linderman and J. J. Nordman. Mr. Nordman is secretary of the committee.

About 50 branches of United States firms have been established in Canada since the outbreak of the war, representing an investment of $15,000,000. Prior to the war, there were about 450 such concerns in Canada representing an investment of $135,000,000.

Seek Plates for Next Year

Ship Builders Would Like to Buy for 1918 Delivery—One Company Closes for Marine Boiler Steel at $288 Per Ton

Philadelphia, Jan. 15. — Eastern ship builders now are coming into the market for plate tonnage for 1918 delivery. The Sun Shipbuilding Co. has inquired for 6,000 to 8,000 tons for first quarter of next year. This same buyer closed for 500 to 600 tons of marine boiler steel for next year at 14.40c, Pittsburgh. There were also sales of this latter grade to other buyers for earlier delivery at 12.40c, Pittsburgh. Some of the mills have declined to quote at present for 1918 lots of ship plates on the ground that their booked tonnage is so heavy that they do not care to increase it at this time. Foreign ship yards continue freely in the market. An eastern maker this week sold 3,000 to 4,000 tons to Italy for last half at 6c, Pittsburgh. Two more boats, 4,000 to 4,500 tons, for Norway, are in the market and there is also an inquiry for a number of tank vessels, 10,000 to 12,000 tons. Japan is out for further round tonnages and a representative of these buyers who lately has arrived in this country now is awaited in the east for the distribution of some important orders.

Small lots of ship plates have been quoted at 6.50c, Pittsburgh. The common eastern price is 6c, Pittsburgh. It is reported 5.50c, Pittsburgh, is obtainable, but it is difficult to locate such a seller. The demand for tank plates from car, locomotive and structural shops and in fact from all classes of consumption, is very vigorous. A 50,000-ton export inquiry for structural plates continues to attract the attention of the mills. A 17,000-ton inquiry from the Laconia Car Co. remains open. Eastern mills quote ordinary tank plates at from 4.75c to 5c, Pittsburgh base.

Serious Gas Shortage

Pittsburgh, Jan. 16.—Finishing departments in many mills have been forced to shut down, on account of the shortage of gas. Batteries of open hearth furnaces in some parts of this district have stood idle several days, on account of the shortage of fuel. Notwithstanding unfavorable operating conditions, most mills are producing more tonnage than they can ship. Some manufacturers have from 50,000 to 75,000 tons of finished stock on hand, awaiting the arrival of cars or motive power. Demand for steel plates is heavy. Ship builders in this and foreign countries are specifying briskly and most of them want more tonnage than provided for in contracts. Plates now being rolled on contracts were sold at prices ranging from 2.50c to 2.75c, although some mills, that have not sold for extended delivery, are shipping stock that was purchased at 3c and even 4c per pound.

Inquiries for Ship Plates

Buffalo, Jan. 16.—Producers and selling interests report several large inquiries for ship plates that so far seem unable to find a mill to take them on. The inquirers are seeking 1917 deliveries.

Heavy Export Demand

Cleveland, Jan. 16.—The demand for plates continues very active and includes many inquiries for export, but Cleveland mills are not disposed to cater to the foreign demand and in many cases do not quote on inquiries. Production of some mills has been seriously curtailed by car shortage. Prices continue very firm and 5c is the minimum for any kind of plates quoted by the local mills. On ship plates, as high as 7c has been quoted by a Cleveland maker, but no actual transactions at that high figure are reported. It seems probable, however, that on a limited order for ship plates, very nearly, if not quite, 7c would have to be paid. Eastern mills are quoting 5c on sheared plates for delivery in 10 months and 4.75c on universal, delivery in from three to four months.

Plate Demand Heavy

Chicago, Jan. 16.—Ship building and other concerns using large tonnages of steel plates are endeavoring to place further tonnages, but larger makers are unable to sell any of this material for delivery during 1917. Although the leading interest is out of the market, it would take on plate tonnage for 1918 delivery for a definite project at present nominal quotations.

Smaller mills, which are able to make reasonably prompt delivery, are obtaining as high as 5.50c for this class of material.

A. T. Wilson, R. W. Beaschler and Andrew A. Lehr are the incorporators of the Belmont Motor Co., Toledo, O., for $125,000. Andrew Lehr, formerly of the Pope-Toledo plant, which is now the Willys-Overland Co., is president and general manager of the new company; Benjamin F. Gantz, vice president; and A. H. Miller, secretary-treasurer. The company has already purchased ground and plans are being completed for the most modern factory buildings to be had. The automobile to be manufactured will be known as the "Belmont" and was designed by Mr. Lehr.

(*For complete prices see page 232.*)

Pipe Mills Busy

Demand From Oil and Gas Regions is Heavy

Pittsburgh, Jan. 16.—With crude oil selling at the highest prices recorded in 40 years, demand for oil country goods for shipment to oil and gas regions is heavy. The James Seep Purchasing Agency now is quoting Pennsylvania crude oil at $3.05 a barrel. The only price to approach the $3.05 figure is that which was offered in February, 1877, when the market, controled by speculators, was quoted at $3.21¼ a barrel. In subsequent years, the market for crude oil has been quoted at as low as 40 cents a barrel.

Several inquiries involving from 5,000 to 20,000 tons of wrought pipe are pending in western Pennsylvania and eastern Ohio. Mills have enough tonnage on hand to maintain present operating rates well into the second quarter and in many instances into the third quarter of this year. Deliveries of boiler tubes and seamless tubing are even more deferred than those of pipe. Published prices of these products are nominal; premiums of several dollers a ton are being asked for shipment before Sept. 1.

Order Not Placed

Cleveland, Jan. 16.—The local buyer who sent out an inquiry for 40,000 tons of steel pipe recently has given up hope of being able to get the order filled for 1917 delivery; manufacturers were unable to meet the price requirements, and the fact that their books are already filled with orders acted as a strong deterrent to their taking on this additional business.

Wire Prices Unchanged

Pittsburgh, Jan. 16.—Prices of wire products have not changed their position since Nov. 24, 1916, when quotations were put up $3 a ton all along the line, to $3 a keg as the base price of nails. Frequent rumors of an impending advance in prices are heard, but no formal announcements have been made by the more important manufacturers. Specifications are described as heavy and some new demand exists. Jobbers have enough tonnage under contract to meet the spring requirements of their trade.

Scrap is Low

Weakness Continues at Pittsburgh and Other Centers

Pittsburgh, Jan. 16.—Prices of old materials in the Pittsburgh district have sagged considerably the last few weeks. At first it was believed that declines were caused by talk of peace, but now it is apparent that the recession in prices was not caused entirely by the possibilities of a change in the European war situation. Consumers have heavy stocks of scrap on hand and will not need additional tonnages for several weeks. Dealers are covering requirements as prices decline further. No change in the trend of quotations is expected until an active buying movement is enjoyed. Heavy melting steel is hovering around $23 or $24 and other grades are proportionately weak in price. Low phosphorus steel scrap and rerolling rails are about the only items on the list to reflect strength. Low phosphorus scrap has sold at $35 and rerolling rails at $31 a ton in the last week or 10 days.

Market is Spotty

Philadelphia, Jan. 15.—Easy prices continue the rule in old material in this district, but these have not extended to the point of general weakness and some grades are softer than others. This latter fact makes the market spotty. Dealers find it difficult to do business because of the light buying by consumers, and the numerous railroad embargoes are increasing these troubles. Heavy melting steel is lower on sales between brokers where $21 and $21.50, delivered, have been done, and in one instance there was a sale below $21, delivered. No transactions with the works under $22, delivered, are noted.

Not so Particular Now

New York, Jan. 16.—Italian buyers who have been in the market on various occasions for a number of months, now have made their specifications more liberal to include various classes of steel scrap and an increased number of sales in smaller amounts are resulting. Originally, these buyers would accept only crops and the highest grades of steel. The buyers are furnishing the vessels. A leading New York merchant practically has completed the shipping of an order for 40,000 tons of miscellaneous steel to Italy. A new inquiry for 25,000 tons or more from a merchant has been current here, but nothing has resulted from it. Domestic business is small and consists of miscellaneous lots. Prices show a softer tendency but there is no pronounced weakness.

Consumers Withdraw

Buffalo, Jan. 16.—The price situation as far as dealers are concerned remains unchanged. Consumers have for the most part withdrawn from the market as far as new business is concerned, and while virtually no sales are being made at the schedules quoted, it is reported that no lines are obtainable at figures which would indicate a softening of the market. Dealers instead of inviting business by easing schedules are holding firm and for the present are busily engaged in getting out higher priced tonnages remaining to be filled on orders previously booked.

There is a large demand for heavy steel for foreign consumption. This inquiry was previously reported, but up to the present remains unsatisfied. Some users have placed embargoes on further shipments of scrap to them, being engaged in getting out urgent orders under contract instead of taking on material to go into subsequent production.

The few instances where prices have been shaded by dealers have been to clear up limited lots involved in carload embargoes and of insufficient volume to alter market schedules on stocks regularly held.

Chicago Scrap Lower

Chicago, Jan. 16.—Continued decline by small losses from week to week mark the situation in iron and steel scrap in this market. The recession from the high point early in December has continued steadily but has been gradual and no decided break has taken place. Rerolling rails, which at one time were quoted as high as $32.50, are now available at $27.50 to $28 per gross ton. Heavy melting steel is steady at $20.50 to $21, with slight demand. No. 1 railroad wrought holds at about $24 per net ton.

Consumers apparently filled their requirements during the steady buying of November and early December and have remained out of the market consistently for several weeks. Most dealers expect lower prices rather than higher, and considerable short selling has been done.

Railroad offerings are slight, and at present only two lists are being considered. The Southern Railway offers 2,200 tons, and the Chicago, St. Paul, Minneapolis & Omaha railroad 890 tons.

Dull But Firm

St. Louis, Jan. 15.—The scrap market remains quiet in this district, not having reacted from the slump which during the latter part of December brought a reduction of from $1 to $3 in prices. Consumers are remaining inactive, and the only condition holding prices is the fact that so little tonnage is offered. Purchasers of heavy melting scrap last week were on a basis of from $21.50 to $22 a gross ton. Except for the concession that is being made to move scrap on tracks, the market exhibits a degree of firmness, and a few dealers are willing to sell short on present market prices. Cast iron car wheels are holding up fairly well, and sales as high as $22.50 a gross ton have been made. The only railroad offerings before the market are: San Antonio & Arkansas Pass railroad, 1,750 tons; St. Louis-Southwestern, 250 tons.

May Strengthen

Cincinnati, Jan. 15.—The feeling in the iron and steel scrap market is that prices will strengthen before the end of the week. The situation is quiet, and the market has suffered two declines in the past two weeks. Supply of scrap on hand in dealers' yards is now much larger than consumption. One dealer reports a sale of heavy melting scrap in an adjacent territory, as low as $19 a gross ton, Cincinnati. No. 1 machine cast is being sold as low as $15.50 to $16 a net ton. No. 1 railroad wrought, while strong in surrounding territories, is being offered here at from $19 to $20 a net ton.

(For complete prices see page 232.)

Replogle's New Steel Project

New York, Jan. 17. (By wire.)—A number of prominent men are associated with J. L. Replogle in the development of a steel works project at Wharton, N. J. Among them are Harry Payne Whitney, Charles M. MacNeill, president of the Utah Copper Co.; James J. Flannery, of the American Vanadium Co., and L. W. Baldwin, president of the Empire Trust Co., New York. The organization of the works still is in process of formation.

Car Shortage

New York, Jan. 17.—The freight car shortage was 59,892 on Dec. 31, compared with 107,778 on Dec. 1.

Albert Broden, superintendent of the Temple, Pa., furnace of the Seaboard Steel & Manganese Co., has resigned.

The Oxweld Railroad Service Co., Chicago, has increased its capital stock from $600,000 to $1,500,000.

Shape Output is Reduced

By Shortage of Semi-Finished Steel and Deliveries Are Delayed —Considerable New Business Pending

Philadelphia, Jan. 15.—Structural shape tonnage of size has become more difficult to obtain under a term of months, due both to the active demand for this product and to shortage of crude steel, which are reducing the outputs of certain mills. Some companies rolling a variety of finished products are unable to offer much shape tonnage because the raw steel requirements in other and more profitable lines are so large. Some of the shape mills also are devoting a large part of their efforts to the manufacture of ship shapes, for which attractive prices are being paid. One eastern shape producer wants not less than four to five months for a tonnage; another will make no promises whatever and has been refusing business even for shipment at his convenience, as present obligations will absorb his output for many months. Only odd lot business is being accepted. Some of the smaller shape mills of this producer are sold up to September.

A large amount of new tonnage is in the market, three pending inquiries in this immediate territory calling for about 25,000 tons. Eastern mill prices are from 3.50c to 3.75c, Pittsburgh, or 3.659c to 3.909c, Philadelphia, the higher figure applying to odd lots.

The Year's Record

New York, Jan. 16.—With December awards now reported at 85 per cent of shop capacity, or approximately 148,000 tons, the grand total of structural lettings for the calendar year of 1917 is placed at approximately 1,483,600 tons, according to the statistics of the Bridge Builders' and Structural Society. The monthly reports of the percentage of shop capacity contracted for and the approximate tonnage for the past 12 months are as follows:

Month.	Per cent.	Approx. tonnage.
December, 1916	86	148,000
November	78	134,000
October	77	132,500
September	52½	99,000
August	64	110,000
July	47½	83,600
June	58	100,000
May	80	137,000
April	72½	125,000
March	102	175,500
February	75	129,000
January	69	119,000
Grand total		1,483,600

The manner in which fabricated steel prices have advanced during the past six to nine months was illustrated by the bids taken during the past week for the steel work for the Lavonia avenue elevated line in Brooklyn. The American Bridge Co. submitted a figure of $91, per ton, delivered, for 15,100 tons of riveted steel and of $84, delivered, for 600 tons of beams and shapes. On alternate bids including the supplying of the steel and the construction, the Oscar Daniels Co. was low at $98.50, on the riveted work and at $105.50 for the beams and shapes. These bids are $4.50 to $10.50 per ton higher than those originally submitted for this work last May, which the public service commission did not accept.

A large tonnage of work is in the market, but it is characteristic of the situation that the jobs which get beyond the bidding stage are few probably because of the high prices. Two or three extra large propositions requiring 35,000 to 40,000 tons are being quietly figured. Plain material prices are firm at from 3.10c to 3.50c, Pittsburgh, or from 3.269c to 3.669c, New York.

Fabricators Busy

Pittsburgh, Jan. 16.—Demand for structural material continues extremely heavy. Specifications are coming out actively and considerable new business is enjoyed. The American Bridge Co. has taken 2,000 tons for a 12-story building for the Home Savings & Trust Co., Youngstown, and 1,500 tons for a power station for the Acme Power Co., Toledo, O. The General Electric Co. is closing for 1,500 tons for a new foundry building at Erie, Pa.

Shape Tonnages Small

Chicago, Jan. 16.—Building activity in the west is considerable hampered by the scarcity of structural shapes which have been sold to an extent that has practically filled the mills producing this material.

The quotation is nominally 3.29c, Chicago mill. Recent projects closed by fabricators are for tonnages no greater than 500 tons. The largest recent letting involves 543 tons for storehouses at the Rock Island arsenal.

New Construction Delayed

Cleveland, Jan. 16.—It is clear that railroad embargoes are interfering seriously with much new construction, including even factories. Delay is not due entirely to slowness of delivery of steel, but to a large extent to inability to obtain other materials. Considerable business in ore and coal-handling machinery is being delayed by poor railroad service and much difficulty is being experienced in obtaining motors and other equipment.

(*For complete prices see page* 232.)

CONTRACTS AWARDED.

Rock Island arsenal, 18 store houses at Rock Island, Ill., 543 tons, to Stupp Bros. Bridge & Iron Works.

A. G. Spalding & Bros., building at Chicago, 420 tons, to American Bridge Co.

Wisconsin highway commission, Trenton bridge over Wisconsin channel of Mississippi river, town of Trenton, Pierce county, Wis., 280 tons, to Worden-Allen Co.

Vandalia Coal Co., three coal tipples at Terre Haute, Ind., 210 tons, to Indiana Bridge Co.

Oliver Iron Mining Co., additional shaft sets for "E" shaft, Aurora mine at Ironwood, Mich., 122 tons, to American Bridge Co.

Steel and cast iron for extension to converter slag casting machine at Garfield, Utah, Utah Copper Co., 122 tons, to Minneapolis Steel & Machinery Co.

Open hearth building for the new Worth steel works at Claymont, Del., 1,600 tons, to the Lackawanna Bridge Co.; 1,000 tons for charging floor, still pending.

Addition to the plant of the Continental Motors Co., Muskegon, Mich., 800 tons, to the Lackawanna Bridge Co.

Foundry for the General Electric Co., Schenectady, N. Y., 1,100 tons, to the McClintic-Marshall Co.

Four sub-stations or the Interborough Rapid Transit Co., New York, 1,000 tons, to the American Bridge Co.

Foundry at Erie, Pa., for the General Electric Co., 1,600 tons, to the McClintic-Marshall Co.

Additions to the plant of the Link Belt Co., Nicetown, Pa., 600 tons, general contract to the Wm. Steele Sons Co.

Ferguson Steel & Iron Co., Buffalo, plant addition general contract to John W. Cowper Co., Buffalo, requiring 700 tons structural steel.

Twelve-story building, Home Savings & Trust Co., Youngstown, 2,000 tons, to the American Bridge Co.

Power station, Acme Power Co., Toledo, O., 1,500 tons, to the American Bridge Co.

CONTRACTS PENDING.

Addition to the plant of the General Electric Co., Erie, Pa., 1,800 tons, bids being taken.

Additional portions of new steel works, Mark Mfg. Co., Chicago, 4,000 tons, bids being taken.

Structural shop, 3,400 tons, for the League Island navy yard, Philadelphia, bids to be received by the government, Jan. 29; on a crane runway, 5,000 tons, bids to be received Jan. 22; six store houses, Indian Head, Md., and extensions to light and power system, Norfolk, tonnage not estimated.

Sections Nos. 201, 202 and 203, new subway lines, Philadelphia traversing Broad, Arch, Eighth and Locust streets, about 8,000 tons, bids to be taken Feb. 6.

Extensions to plant of New York Ship Building Co., Camden, N. J., 7,000 tons, project abandoned for the present and temporary structures requiring no steel, to be erected.

Train shed for Indianapolis railway, Indianapolis, 3,000 tons, bids taken this week by Philadelphia architects.

Bridge work for the Pennsylvania railroad, 400 tons, bids being taken.

Kneeland garage, Cambridge, Mass., 1,100 tons, bids being taken.

Cement plant near Birmingham, Ala., for the International Portland Cement Co., 1,000

tons, bids being taken, by the Fuller Engineering Co., New York.

Bridge work for the Baltimore & Ohio at Chicago, 300 tons, bids being taken.

Y. M. C. A. building, Worcester, Mass., 600 tons, bids being taken.

Coaling station at a Virginia point for the Norfolk & Western railroad, 300 tons, bids being taken.

Warehouse for Austin & Doten, Cambridge, Mass., 400 tons, indefinitely postponed.

Foundry building, General Electric Co., Erie, Pa., 1,500 tons.

Terminal station at Richmond for the Atlantic Coast line, 800 tons, bids being taken.

Lucius apartment, Grand Central zone, New York City, 9,000 tons, bids being taken.

Addition to the store of Abraham & Strauss, Brooklyn, 1,900 tons, bids being taken.

Initial unit for large plant of Westinghouse Electric & Mfg. Co., Essington, Pa., 7,700 tons, bids being taken by the engineers, Westinghouse, Church, Kerr & Co., New York. Additional units to be inquired for later.

Distributing station for large mercantile house, Montreal, 10,000 tons, bids being taken.

Elevated railroad construction, Lavonia avenue, Brooklyn, 15,700 tons, American Bridge Co. low bidder on steel work.

Tin Plate Buyers

For Shipment Abroad Cannot Place Orders

Pittsburgh, Jan. 16. — With virtually every manufacturer unable to promise additional material for delivery the first half of the year, the market for tin plate is almost at a standstill. Rather heavy demand exists for shipment the second half, but none of the mills has opened books for delivery after July 1, next. Some tonnage has been reserved, to be shipped at prices to be determined later. The market for nearby delivery is quoted at $7 to $8, base, although scarcely any material is being sold for prompt shipment in this territory. Inquiries for export involve tremendous tonnages in the aggregate. Buyers of tin plate for shipment abroad have just about given up in their attempts to obtain tonnage in this country.

Freight Conditions Getting Worse

Pittsburgh, Jan. 17. (By wire.)—Continued cold weather further is retarding the movement of freight in this territory. Traffic managers of several iron and steel companies say the general traffic situation is more unsatisfactory today than it has been at any time since just previous to the holidays. Heavy tonnages of finished commodities are piling up at the mills. The Carnegie company and other blast furnace owners are suffering for want of coke.

James E. Ferguson, president of the Ferguson Steel & Iron Co., Buffalo, has been elected a director of the Buffalo chamber of commerce.

Decides Not to Buy Rails

Pennsylvania Railroad Withdraws Its 1918 Inquiry for 205,000 Tons—French State Railways Send Out Inquiry for 20,000 Freight Cars

New York, Jan. 16.—After having conducted prolonged negotiations, the Pennsylvania railroad has withdrawn its 1918 inquiry for 205,000 tons of rails and officially states it will make no purchases at this time, at the higher prices quoted for that delivery. It has asked the mills to hold open for it the space quoted upon, but the latter have not been inclined to accede to this request and some have refused it absolutely. It is not stated what reasons have impelled the Pennsylvania system to adopt this cause in contract with the recent action of other leading roads, but it is inferred it is felt by the officials, there is nothing to be gained by buying so far ahead under present conditions. Some of the makers who were reluctant to quote on the Pennsylvania inquiry because they have considered prevailing rail prices as unattractive, have welcomed the decision not to buy.

A number of new rail inquiries are current. The Grand Trunk has inquired for 55,000 tons both for this country and Canada. The French government railways have asked for 10,000 to 20,000 tons additional in two lots. The Reading bought 5,000 tons of the Bethlehem Steel Co. for 1918. Dutch railway authorities have closed for 2,000 to 3,000 tons for Java.

American car builders are much interested in the new inquiry for a minimum of 20,000 freight cars for the French State railways, which has been put out by J. P. Morgan & Co. Four lots of 5,000 each of box, gondola and modified box and gondola types are specified. It is reported the final order may be as many as 40,000, if manufacturing space can be obtained. These cars will require about one-half of the steel of the standard American car, or probably 5 to 10 tons each. The specifications are exacting in that a large amount of machine shop work is called for. The Standard Steel Car Co. has taken 400 cars for Java railways.

Domestic car buying is not so heavy, but the Burlington has placed 1,500 general service with the Pressed Steel Car Co., and the Illinois Central 500 automobile, with the Standard Steel Car Co. The Boston Elevated bought 35 subway cars for the Pressed Steel Car Co. The Texas Pacific has inquired for 400 coal and 200 stock cars.

Locomotive orders continue active. The American Locomotive Co. has received 50 from the New Haven, 25 from the Northern Pacific, 24 from the Southern Pacific and several scattering.

Rail Sales are Light

Chicago, Jan. 16.—Practically no sales of standard steel rails were made in this market during the past week. However, large inquiry is being entertained and rail mills will be filled to the limit when these have been considered and closed. The Grand Trunk railroad is in the market for 50,000 tons, the Pennsylvania inquiry for 205,000 tons has not yet been placed and the United States government is inquiring for 25,000 tons for railroad building in Alaska. The Baltimore & Ohio railroad, which withdrew its former inquiry, is understood to be in the market again, asking for 25,000 tons. Other important railroads which have not yet placed their 1918 tonnages are the Chesapeake & Ohio, Northern Pacific Chicago & Eastern Illinois and Rock Island railroads.

Ralph Zidt, formerly manager of sales of the Republic Iron & Steel Co., in Chicago, and more recently in business for himself in that city, has become associated with the Federal Export Corporation, 111 Broadway, in New York City, as assistant to Dwight S. Guthrie, who recently became manager of the iron and steel department.

Col. H. L. Haldeman, president of the Pulaski Iron Co., became president of the Eastern Pig Iron Association for the ensuing year at the January meeting, succeeding Ralph H. Sweetzer. Col. Haldeman recently also has taken office as state senator from the Lancaster-Lebanon district.

The Griffin Mfg. Co., manufacturer of cold rolled strip steel for pressed, stamped and drawn work, Erie, Pa., is putting up a building 108 x 152 feet, steel frame, with brick and glass side walls, to be used for annealing and heat treating.

Ground was broken Dec. 27 at the Franklin plant of the Cambria Steel Co. for the erection of two blast furnaces recently authorized by the directors. The Cambria Steel Co., it is announced, is considering the erection at Johnstown of a plant for the manufacture of car wheels to cost $2,000,000.

(For complete prices see page 232.)

Daniels Feeds the British Lion

Spurns Offers of American Manufacturers

Unamerican, Milk-Sop Policies in the Navy Department May Lead to Purchase of British Projectiles for Big Guns—A Vicious Stab at Industrial Preparedness

CONSISTENT with a policy he has pursued ever since his advent as a member of the Wilson cabinet, Secretary of the Navy Josephus Daniels is said to have personally requested a foreign manufacturer to submit prices on 14 and 16-inch armor piercing shells in accordance with a recent inquiry issued by the bureau of ordnance. As a result, the great English ordnance firm headed by Sir Robert Hadfield may be awarded a contract for projectiles for the American navy. Let this statement sink in!

The absence of virility and the pitiful puerility of such a policy smirch our national honor and destroy the very foundations of preparedness. A more staggering blow could not be delivered at the vitals of our national self defense than to place the United States in dependence upon foreign powers for its munitions; yet Daniels has made the first move toward such a calamity by soliciting bids for shells from a foreign power.

Danger in Daniels "Competition"

While the system of sending out advertisements for bids from the navy department to representatives of foreign manufacturers has the sanction of precedent, Mr. Daniels has misused the custom by suspending it like a sword of Damocles over the heads of American producers, in a futile attempt to coerce them to submit figures which will strike his fastidious fancy as "reasonable". To use a favorite expression of the secretary, he is endeavoring to compel "competition" among domestic manufacturers. Those who are familiar with Mr. Daniels' attitude toward terms and prices cannot conceive the possibility of American producers being able to meet his approval. They have repeatedly made earnest attempts to co-operate with Mr. Daniels at the sacrifice of their business interests, but, except on rare occasions, he does not indicate his appreciation by so much as a good word. Should a foreign manufacturer offer bids lower than those of the American producers, however, the former becomes the recipient of Mr. Daniels' warmest praise. If the contracts are awarded abroad, the sword will not fall upon the heads of American manufacturers, as Mr. Daniels would have it, but upon the heads of the citizens of the United States.

The bids for projectiles, which were opened early this month, involved in all 7,200 16-inch and 8,100 14-inch armor piercing shells and 900 class B projectiles. On 4,500 of the 14-inch shells, the Hadfield bid was $356 apiece, delivery after 11 months, to be at the rate of 500 shells a month. The lowest American bidder, the Washington Steel & Ordnance Co., offered to make 1,000 shells for $500 each. Deliveries 20 months after the contract is awarded were promised at the rate of 250 shells per month. Other American manufacturers bid as follows: The Crucible Steel Co., 2,000 shells, to cost $543.50 each and to be delivered at the rate of 500 every two months after 1,075 days; the Midvale Steel & Ordnance Co., 5,600 shells to cost $550 apiece, deliveries to start in 600 days and to be maintained at the rate of 500 at six-week intervals. Hadfields offered to make 3,000 of the 16-inch shells for $513 apiece, under the same delivery specifications as stated for the smaller shells. The Washington Steel & Ordnance Co. was also low among the American bidders on the 16-inch shells. The bid of this company was $750 a shell for 2,500 shells. Initial delivery on these shells was promised at the end of 20 months; the rate was stated as 165 a month. The Bethlehem Steel Co. offered to make 4,000 16-inch shells for $775 apiece, delivery to start in 22 months and to continue at two-month intervals in unstated lots. The Midvale Steel & Ordnance Co. asked $900 apiece on an order of 1,000 shells and promised to make an initial delivery at the end of 600 days. After this, 500 shells were to be finished every two months.

Penny Wise, Pound Foolish

The lower cost of labor and material and the conditions applying to the manufacturing operations abroad as compared with the higher costs of labor and material and conditions obtaining in the industry in the United States appear to have received no consideration by Mr. Daniels. The necessity of American manufacturers being given this business so that they may bring it up to the required state of efficiency, ready for application in times of emergency, seems to have been entirely disregarded in Mr. Daniels' vain attempts to bring the arrogant American manufacturers to what he chooses to consider "the proper terms". "Prices" and "competition" appear to have been the only elements that influenced his consideration.

There is no assurance that Hadfields can meet the specifications required.

The Mirth of a Nation

MEDDLESOME interference with the meager maintenance program of the United States navy resulting in a retrogression of our prowess at a time it should be at its height; wanton waste of the people's money for an $11,000,000 armor plate plant; support of the Tavenner bill to reduce the production of munitions in government plants when they should be operating at a maximum; ridiculous lack of expediency and discretion in handling the bids on the tardy program for naval expansion; and finally the consideration of foreign bids on shells for the United States—these are the highlights in the career of one Josephus Daniels, formerly editor of an obscure weekly newspaper and now secretary of the navy of the United States. The childishness of these policies and their inane diplomacy would give rise to satirical laughter were it not for the deplorable fact that one with these characteristics holds in his hands the crux of our preparedness. History reveals but few occasions when the office of the secretary of the navy was in greater need of a fearless, self-reliant man with keen perception and unswerving loyalty to the United States than it is at the present time. We can hardly conceive of a grosser blunder than to place the country in dependence upon foreign powers for its munitions. Must the nation's honor be sacrificed, Mr. Daniels, and the country endangered because of your notion that nearly all manufacturers are highway robbers? Do you not realize that it is possible for the United States to be duped by a foreign power that would not hesitate to take advantage of the altruistic simplicity of your policies?

They are entirely new to that concern, and there is no assurance that even if they could make the shells, the British government would permit them to deliver any munitions to the American navy. A contract would have no more value than a scrap of paper in view of contingencies which may arise during the present war.

Is There an Ulterior Motive?

Strange, is it not, that the greatest producer of iron and steel in the world should have to turn to a foreign nation for its armor piercing projectiles—and suppose that nation should suddenly become a belligerent enemy? The tremendous advantage held by the central powers over the entente nations at the outbreak of the war is explained to a great extent by the fact that these nations were dependent upon the countries of the triple alliance for a large portion of their munitions. Why should any nation, especially one needing munitions so badly as England, be so anxious to secure a contract for our shells that it is willing to make them below cost? Why is it that American manufacturers can make millions of shells for others and none for the United States?

Two principal contentions have been made in an effort to justify an award of contracts for the 14-inch and 16-inch armor piercing shells to the British manufacturer. One is that its prices are considerably lower than those of American ordnance makers; the other is that the latter have been unable to meet department specifications for 14-inch shells. No contracts for 16-inch projectiles ever have been awarded to American producrs. It is true that the Bethlehem Steel Co. is now under a heavy penalty because of its failure to meet the rigid specifications named in a contract it has for 14-inch projectiles. Despite this, the Bethlehem company, according to its officials, is spending large sums in an effort to satisfy the government's requirements, which, many think, are both excessive and unnecessary. Unless American manufacturers are given contracts for these projectiles, they will not be prepared to supply them when there is no alternative. If they are willing to assume the responsibility of manufacturing the shells and are willing to stand probable losses through penalties for not meeting the rigid specifications, Secretary Daniels should extend the scope of his vision beyond the pine trees of North Carolina and manifest sufficient patriotic foresight to give them the work.

The British concern, according to its bids, would have to send experimental shells to America so that they could be tested before it proceeded with its contract. If the tests showed the shells did not meet specifications, prolonged shipping delays would result before other experimental shells could be made and shipped across the ocean; finally, if the shells failed all tests, Mr. Daniels would have to turn to American makers after all. Even though the foreign experimental shells might meet the specifications, it is possible that the government might find itself in most embarrassing international relations should the projectiles made on contract prove unsatisfactory.

Perhaps Hadfields, particularly at the present time, can make the shells at lower cost than American makers. At the same time, there is a belief that the bids they submitted do not represent any profit, and that once American manufacturers were driven from the market, the foreign prices would quickly be boosted to a high level. If American makers were given an opportunity to gain practical experience in manufacturing large shells to meet the specifications, prices offered by them probably would be reduced considerably. The process of manufacture employed by Hadfields is said to be one reason why its bid is so much lower than those submitted by American makers. There is, however, some doubt as to this. It is said, in fact, that American ordnance makers in the past have been given an opportunity to adopt this process, but declined to do so on the ground that it was neither efficient nor satisfactory.

Nothing Seems to Satisfy

At a conference he held last week with American ordnance makers, the latter told Mr. Daniels they would make certain reductions in the figures they had submitted for shell contracts. They advised him, however, that they would not even attempt to meet the Hadfield figures because this would be utterly impossible. Mr. Daniels said later, as was to be expected, that the reductions offered were not sufficient. He said then that it was not only possible, but probable, that he would give the contracts to Hadfields, provided the British government gave its permission. He used the word "possible", when a New York newspaper correspondent, with undisguised surprise, asked Mr. Daniels if it were possible he was thinking of giving the contract to a foreign maker. Representatives of the American ordnance manufacturers who conferred with Mr. Daniels, at the latter's request, included President Eugene G. Grace of the Bethlehem Steel Co.; President Alva C. Dinkey of the Midvale Steel & Ordnance Co., and O. H. Wharton, assistant to the president of the Crucible Steel Co.

It is also understood that Mr. Daniels reiterated his dissatisfaction at prices asked by the Bethlehem and Midvale companies for 16-inch guns for the four battleships of the 1917 program, and that, in a final effort to co-operate with him, the manufacturers offered further concessions in prices. Again Mr. Daniels said he was not satisfied with their offers. The irreconcilable differences between the secretary and the manufacturers and ship builders have resulted in hearings being called by the house naval affairs committee this week to go over the entire situation.

Will Make High Grade Steels

Chas. M. Hammond, president of the Hammond Steel & Forging Co., Syracuse, and formerly connected with the Halcomb Steel Co. and the Sanderson Steel Co., Syracuse, has sold his interest in the Hammond Steel & Forging Co. and has retired to become president of a new company, which will be located in Auburn, N. Y. The company will be known as the Cayuga Tool Steel Co., Ltd. Mr. Hammond will have associated with him prominent interests in America and Sweden. It is the purpose of the new company to erect and operate rolling mills, a hammer plant, crucible furnaces, electric furnaces and an open-hearth furnace for the manufacture of high-grade steels. The company will specialize in high-grade tool and alloy steels.

Will Discuss Preparedness

The monthly meeting of the executive committee of the administrative council of the National Metal Trades Association will take place at the Bancroft hotel, Worcester, Mass., on Friday, Jan. 19. W. H. Van Dervoort, East Moline, Ill., president, will preside. It will be the first time the committee has met in Worcester, the occasion being a New England conservation convention at which President Van Dervoort will be a speaker at the banquet. The principal speaker at the convention and banquet will be James A. Emery, Washington. The convention will really take the form of a gathering of manufacturers for industrial preparedness. Jerome R. George, of the Morgan Construction Co., president of the Worcester branch, National Metal Trades Association, will preside at the banquet.

High Wage Scales

Of Employes in Bar Iron, Sheet and Tin Plate Plants

Pittsburgh, Jan. 16.—Bar iron, sheet and tin plate mill employes working under wage scales of the Amalgamated Association of Iron, Steel and Tin Workers received substantial increases in pay, as a result of the bi-monthly examination of sales sheets at Youngstown, Jan. 10. The following actual sales averages for November and December of 1916 were developed: Bar iron, 2.15c; No. 26, 27 and 28 gage bessemer black steel sheets, 2.80c; 100-pound tin plate, base box, $4.25. Compared with averages for September and October of 1916, bar iron in November and December advanced 15 cents, or $3 a ton; steel sheets advanced one point, from 2.75c to 2.80c, and tin plate advanced from $4.10 to $4.25 a box. In January and February of this year, puddlers will receive $10.30 a ton for boiling, or 75 cents a ton above the rate prevailing in November and December. Sheet and tin plate mill employes had their wages boosted about 1½ per cent.

The average price of bar iron in 1916, as developed through the bi-monthly examinations of sales sheets, was 1.825c, compared with 1.138c in 1915, 1.1843c in 1914 and 1.4421c in 1913. The average price of Nos. 26, 27 and 28 gage bessemer black steel sheets in 1916 was 2.60c. The year's average price of tin plate was $3.89. Puddlers in mills operating under Amalgamated Association wage scales now are receiving the highest wages ever paid in the history of the craft in America.

Will Build Third Blast Furnace

Philadelphia, Jan. 16.—Plans are being prepared by the Alan Wood Iron & Steel Co. for the erection at Swedeland, Pa., of a third blast furnace to its present group. The company now has two complete furnaces with an annual capacity of about 275,000 tons. One of these was erected in 1912. In 1914, the company dismantled its No. 2 furnace which was built in 1890-1891. It has not been determined finally whether the new construction will consist of a full unit equipped with blowing capacity, stoves, etc., or merely an alternate stack to be run in connection with the present two furnaces. The need of the new furnaces arises from the addition of the three open hearth furnaces now under construction to the present steel plant at Ivy Rock, across the Schuylkill river from the blast furnace group. The blast furnaces serve the open hearth department with hot metal by means of a special bridge over the river. Julian Kennedy, Pittsburgh, is preparing the plans for the new furnace. No contracts have been placed to date.

Mill Cinder

And Mill Scale Advance in Price—Annual Contracts

Philadelphia, Jan. 16. — Annual contracting for the calendar year for mill cinder and mill scale, has been carried out at advanced prices by eastern Pennsylvania blast furnaces. Mill cinder has commanded an advance of 50 to 75 cents per ton, or from $4 to $4.50, delivered. In mill scale, the advance has been from $1 to $1.50 per ton, for ordinary quality, while in special instances, $2 more has been obtained. Prices have been from $6 to $6.50, delivered, for ordinary blast furnace use and at $7 for special requirements. The smaller advance on mill cinder is a result of the high prices for coke now prevailing. Since the cinder is highly refractory, an increased amount of coke is required for its smelting and the furnaces have been unwilling to pay for it such advances as in scale. The total tonnage of scale and cinder moved this year in eastern Pennsylvania has been lighter than usual because the output of some of the largest producers now is controled by steel works interests.

Coke Plants

And Coal Property Bought by the American Steel Co.

The Reilly-Peabody Fuel Co., 406 Frick building, Pittsburgh, recently organized with a capital stock of $200,000, has purchased the coal and coke properties of the American Steel Co., Park building, Pittsburgh. The properties include two coke oven plants in the Connellsville district of Western Pennsylvania of the American-Connellsville Coal & Coke Co., which have a monthly output of about 23,000 tons of beehive coke. In addition, the company has a production of about 17,000 tons of coking coal for distribution.

The company was organized by F. E. Peabody, who resigned as manager of the coke and coal department of the American Steel Co. last autumn. Eugene S. Reilly, former president of the American Steel Co., is president of the Reilly-Peabody concern; Mr. Peabody is treasurer and L. P. Monahan, an attorney with offices in the Frick Annex building, is secretary. Upon the re-organization of the American-Connellsville Coal & Coke Co., Mr. Reilly was elected president and director and Mr. Peabody was elected secretary-treasurer and a director to succeed M. B. Kelly and J. P. Kelly, resigned. The company may acquire two additional coke plants and a controling interest in several coal mines at an early date.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Jan. 16.—The publication of the reply of the allies to President Wilson's peace note last Friday was the direct cause of a strong upward movement in metal prices, based on the belief that the war would continue indefinitely, with a consequent postponement of the shrinkage in metal values, which the trade generally believes will follow the conclusion of the war. Copper quotations now are nearly 2c higher than last Thursday, spelter nearly 1c higher, tin about 1½c higher, and lead and antimony are showing a rising tendency. The volume of business has not been exceptionally large, consisting mainly of prompt and nearby metal; demand today was not so active as on the preceding days. Much of the activity has been due to covering of short sales by second hands.

Electrolytic copper has been sold at the following level and in some cases it now is necessary to pay higher; January, 29.50c to 30c, delivered 30 days; February, 29.25c to 29.75c; March, 29c to 29.50c; second quarter 28c. Prime lake copper is quoted at 29c, delivered 30 days, for January and 28.75c for February. Casting copper is quoted at 28c to 28.25c, cash, for January shipment, with some holders asking 28.50c.

Prime western spelter now may be quoted as follows: Prompt and January 9.87½c to 10c, St. Louis; February, 9.75c to 9.87½c; March, 9.50c to 9.75c; second quarter, 9c to 9.25c. Brass special spelter for prompt shipment is quoted at 10.75c to 10.87½c, St. Louis. Due to the congestion of railroad traffic in the middle west, spelter shipments are held up and as a result premiums are asked for material in the east.

The American Smelting & Refining Co. continues to ask 7.50c, New York, and 7.42½c, St. Louis, but the outside interests are quoting higher, so that the market on January shipment is about 7.50c to 7.60c, New York, and 7.40c to 7.50c, St. Louis. Spot lead in New York is selling at a premium.

The antimony market is strong and prices are higher, due to the reduced supply of the metal, and particularly to the shrinkage of spot stocks here. Prompt shipment in 5 to 25-ton lots now is quoted at 14.37½c to 14.75c, duty paid, while 5-ton lots for immediate shipment are selling at 15c and higher in some cases. January-February shipment from the Orient now is held at 12c in bond.

Aluminum reflects an easy tone, and the demand is poor. No. 1 virgin in prompt carloads is quoted at 60c to 62c; No. 1 remelted at 54c to 56c, and No. 12 remelted at 38c to 40c.

(For complete prices see page 232.)

An Unusual View Showing How Coal is Unloaded From Boats for Storage

Handling Coal in Storage Plants

BY HORACE GOLDSTEIN

THE simplest method of storing bituminous coal is to use mechanical means whereby with a minimum initial cost the least number of men are employed to handle a given amount of coal through a definite cycle. The cost per ton to handle coal at a particular plant is the item of greatest interest to the owner. There are so many factors entering into this problem that the details of each case must be studied separately and, in a general discussion, special characteristics cannot be considered. Some of these features are the initial cost of the site, preparation of the ground, which may include grading, drainage, piling, rail connections and dredging, and similar details of the individual installation. The cost of actual handling of the coal on a prepared site is a more or less fixed factor for a given locality by substituting the costs, rates of interest, wages, etc., prevailing there.

Without doubt the method of handling coal which is most economical, simple and flexible is to use a large locomotive crane. This crane should be equipped with a long boom fitted with and arranged to handle a large clam-shell bucket. Practice has taught that such a crane should be approximately of the following dimensions: Length of boom, 110 feet; size of buckets, 5 cubic yards; gauge of tracks, 19 feet; number of four-wheel trucks, four, and approximate weight, 225,000 pounds.

The location of the property has a direct bearing on the several different ways of bringing coal to the storage site and within reach of the crane. The most common arrangements consist of handling coal from railroad cars through their hoppers, and from boats by means of an unloading tower and cable car system or by a crane and cable car system. These methods of coal handling are described in the following paragraphs and the cost of handling coal from railroad cars is given. The coal is delivered at the site in hopper-bottom cars on two parallel tracks of such distance apart that a large receiving or track hopper can be located between, as shown in Fig. 1. The center to center distance of tracks is usually made about 34 feet. The railroad tracks are carried over the track hopper by means of heavy track girders, shown in Fig. 2, and the coal is allowed to fall

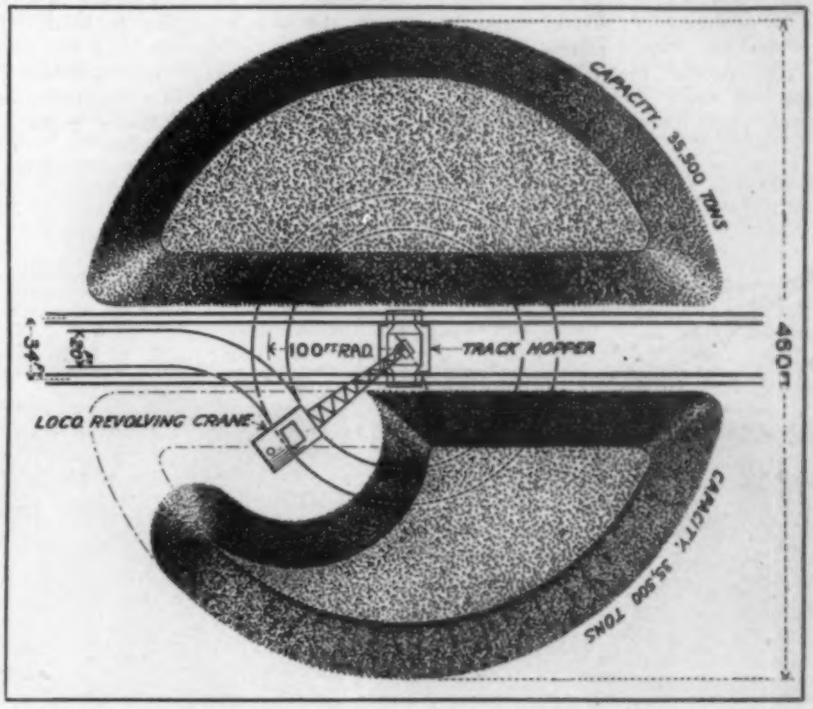


FIG. 1—COAL IS DELIVERED IN HOPPER-BOTTOM CARS ON TWO PARALLEL TRACKS—THE RECEIVING HOPPER IS LOCATED BETWEEN THE TRACKS

The author is engineer, the Link-Belt Co., 299 Broadway, New York.

FIG. 2—THE RAILROAD TRACK IS CARRIED OVER THE HOPPER ON HEAVY TRACK GIRDERS

by gravity from the cars to the hopper. The tracks are on a grade, the loaded cars being placed beyond the track hopper, and as each car is unloaded it is allowed to shift forward by gravity, making room for the next car, and so on. The locomotive-crane tracks are so located that the bucket can always be brought over the track hopper without making the crane travel.

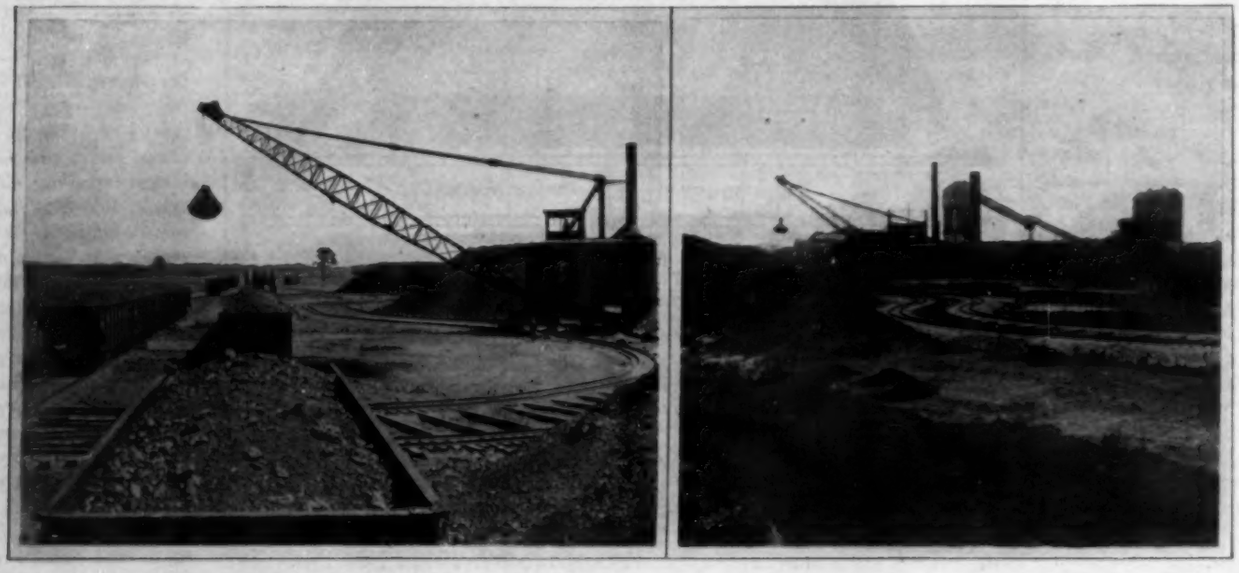
The traveling speed of all cranes is very slow and movement along the tracks should be avoided whenever possible. Circular storage is designed to minimize the travel of the crane, and to use the slowing action or swinging of the boom. This provides for rapid handling and enables the operator to maintain a large supply of coal. A crane of the dimensions given above has a capacity of 2,000 tons in 10 hours; the average is 200 tons per hour; the maximum is 260 tons. Figs. 3 and 4 show how these tracks are placed with reference to the track hopper. The coal is dug from the hopper by the clam-shell bucket, and is delivered to the storage pile. When the storage pile is full the circular track on which the crane runs is covered with coal. By continuing the track system and adding more track hoppers, a succession of storage piles can be formed with a single crane, thus providing unlimited storage. When reloading, the coal is taken from the piles by the bucket and delivered direct to cars on the main receiving tracks.

The covering up of the circular tracks with coal gives the maximum storage for a given area and height of pile. This condition, however, is not considered the best in all localities and for all kinds of coal. The safest and best system is the one in which the crane tracks are left open, as shown in Fig. 5. With such an arrangement the crane is always ready to handle the coal from any point in the storage, and move it to some other point or to cars. This is very important if the coal begins to heat, or if any part of the pile is to be reloaded first. Little or no trouble is experienced from fire in a storage plant where the coal is kept active. If the coal is left in piles for several years, greater care must be exercised, and in such a storage it is advisable to pile the coal so that it can be reached at any time by means of the crane.

Unloading from Boats

The unloading of coal from boats by means of unloading tower, cable-car system and crane is shown in Fig. 6. Two long-radius cranes, one being a duplicate of the other, operate on a track which forms a letter "U". The cable cars run on a trestle and discharge the coal to the ground where the cranes pick it up and place it in storage. The storage space shown in this figure is sufficient for approximately 220,000 tons of coal. The ground occupied is about 600 feet wide and 1,200 feet long. All the coal in the above storage is tributary to the cranes, and for reclaiming, the coal is discharged to a traveling receiving hopper located on the cable-car trestle. From this hopper the coal is delivered to the cable cars, and is then taken back to a reloading conveyor running to boats. In this case the crane acts as a sort of distributor.

Coal is unloaded from boats by means of a long-radius crane, discharged into a receiving hopper, and thence into ele-



FIGS. 3 AND 4 SHOW HOW THE TRACKS ARE PLACED WITH REFERENCE TO THE HOPPER

vators leading to an overhead transfer bin. From this point the coal is either taken by the cable-car system and dumped under the trestle and distributed in the manner described in the last paragraph, or taken direct from the transfer bin and loaded into railroad cars. The locomotive crane unloads the boats, as well as stores out and reclaims the coal. In this particular case there is a crushing plant, and coal can be stored either in a crushed or run-of-mine condition. The layout of the locomotive-crane tracks is different in this case from the others already described. At the water end, the crane is run out on a dock.

The Cost of Handling Coal by Means of Railroad Cars

The current size of the storage is from 100,000 to 150,000 tons per crane, with the inclination toward larger units. On the basis of handling into storage 150,000 tons per year the crane must handle a total of 300,000 tons. Usually coal can be put into storage in a leisurely manner, but it must be reclaimed quickly. The system first described however, is equally fast in storing out and reclaiming, and with a crane of a capacity of 200 tons per hour it would require 150 days to handle and rehandle this quantity. The present cost of the crane itself erected on tracks is $33,500. The cost of each concrete track hopper, together with steel girders for carrying the railroad tracks, is $4,500, and for storage of the size mentioned above, with the coal approximately 20 feet high, (see Fig. 5) three of these would be required, or an expenditure of $13,500. The crane operator receives $4.00 per day, the fireman $2.25 per day, and the laborers, of whom three would be required to spot cars, dump them, clean up the coal around railroad tracks, etc., receive $2.00 per day each. A complete outline of costs follows:

Interest on $33,500 (cost of crane) at 6 per cent	$2,010.00
Interest on $13,500 (cost of hoppers) at 6 per cent	810.00
Depreciation on crane at 8 per cent	2,680.00
Depreciation on hoppers at 5 per cent	675.00
Labor:	
Fireman, 150 days at $2.25 per day	337.50
Engineer, 150 days at $4 per day	600.00
Laborers, 150 days at $6 per day	900.00
Liability insurance (5 men, 6 mths.) about	130.00
Fuel for crane (3,000 lbs. per day at $2.50 per ton)	562.50
Oil, grease, waste, water, cleaning boiler tubes, etc., at $1.25 per day	187.50
	$8,892.50

From the table it will be seen that the cost of handling one ton of coal per round trip is $0.05928, or $0.02964 per ton for taking the coal into storage and the same amount for reclaiming. The above cost does not take into account the cost of the site, preparation of property, or cost of rails, and it is assumed that there are no delays due to shortage of coal, empty cars, or labor. It takes into account merely the time required for handling the coal, namely, 150 days, and does not include any item for foreman or watchman, should they be desired. The cost of this handling as expressed is somewhat higher than would be the case in normal times; almost every item, with the exception of insurance, has been materially increased.

FIG. 6—UNLOADING COAL FROM BOATS BY UNLOADING TOWER, CABLE-CAR SYSTEM AND CRANE

The New Jersey Meter Co., Plainfield, N. J., is distributing a folder describing air meters designed to eliminate air waste. The meters may be used in connection with all air tools including chippers, riveters, rammers, drills, pumps, motors, etc. A number of well known concerns, users of this product, are listed in the folder.

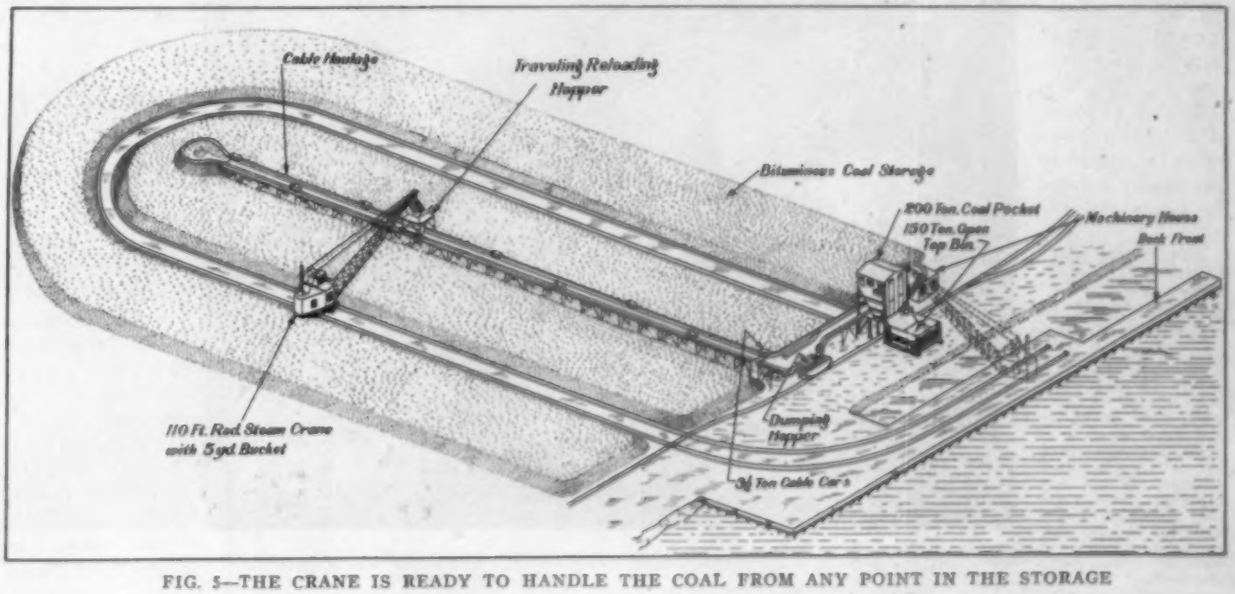


FIG. 5—THE CRANE IS READY TO HANDLE THE COAL FROM ANY POINT IN THE STORAGE

Potash From the Blast Furnace—I

A Discussion and Description of the Methods Employed by the Bethlehem Steel Co. to Reclaim Potash as a Profitable By-Product in the Manufacture of Pig Iron

BY R. J. WYSOR

SINCE the outbreak of the European war, few problems of raw material supply have commanded more nation-wide attention than potash. It is well known that before the war the domestic production of potash was an insignificant percentage of the imports. The average annual importation of raw potash salts for several years prior to 1914 was slightly over 300,000 net tons, and of other potash manure salts about 700,000 tons. The sudden and almost total cessation of these imports created a unique and stringent situation. Methods of recovering potash from feldspar and other native mineral sources, and reclamation from hitherto waste products, have received a marked impetus. Soaring prices have been a keen incentive to research and industrial development.

Although several brief articles concerning the possibilities of potash recovery have appeared in recent trade journals, it still may be a matter of some surprise to the average technical mind that potash might be reclaimed as a profitable by-product in the manufacture of pig iron. At the present time it may be of special interest to present some data, largely of a technical nature, on the subject. About four years ago, in the course of investigating blast furnace stove efficiencies, the fine, yellowish fumes, of which a considerable quantity was removed from the bottom of the stove checkerwork, was analyzed. The sample was found to contain, among other constituents, about 15 per cent water-soluble potash, which was somewhat surprising. This induced an investigation, which showed that considerable quantities of this material, hitherto a waste product, could be recovered from our stoves and gas-fired boiler settings. A search for a market was made without immediately satisfactory results. One fertilizer dealer claimed that the alumina content was too high. Others wished to make practical tests, and, at length, large samples for a full season's demonstration were furnished, satisfactory results being reported. But the pre-war times prices offered hardly seemed to justify the trouble of reclaiming the dust.

With the beginning of the war and the subsequent spectacular rise in the potash market, conditions were changed. Knowing just what dust to recover, reclamation was immediately commenced, a satisfactory contract was negotiated, and this company has been disposing of the dust at a good profit ever since.

Having introduced the subject thus far in the same order in which it was initially investigated, one may now turn logically to an inquiry as to the source of potash in the raw materials charged, behavior in the furnace, and methods for recovering it as a by-product, or of eliminating it as a nuisance. As a matter of both scientific and practical interest, a consideration of sodium will also be attempted, though not so thoroughly as its more important kindred metal, potassium.

Potash doubtless occurs almost entirely in some form of feldspar or clay in all the materials entering the blast furnace.

At Bethlehem ores are received from many quarters of the globe, and an attempt was made to discover whether the relative percentages of alkalies in the various ores bear any special relation to the source, mineralogical nature, or to the silica and alumina contents of these ores. No striking relation was discovered, except that the manganese ores, from widely separated sources, were found to contain relatively high percentages of potash as compared to most iron ores. Iron ores of this country, including those of the south, containing upward of 1 per cent potash, or over, seem to be restricted to small areas. The percentage of potash in different varieties of limestone and dolomite used as flux, varies greatly, largely on account of intermixed clay, and may be surprisingly high. Per unit weight, the potash content of our flux charge at Bethlehem is considerably higher than in either the average ore or coke charge. Few data are available on the alkali content of coke from different localities. Various standard Connellsville cokes which have been examined have shown a

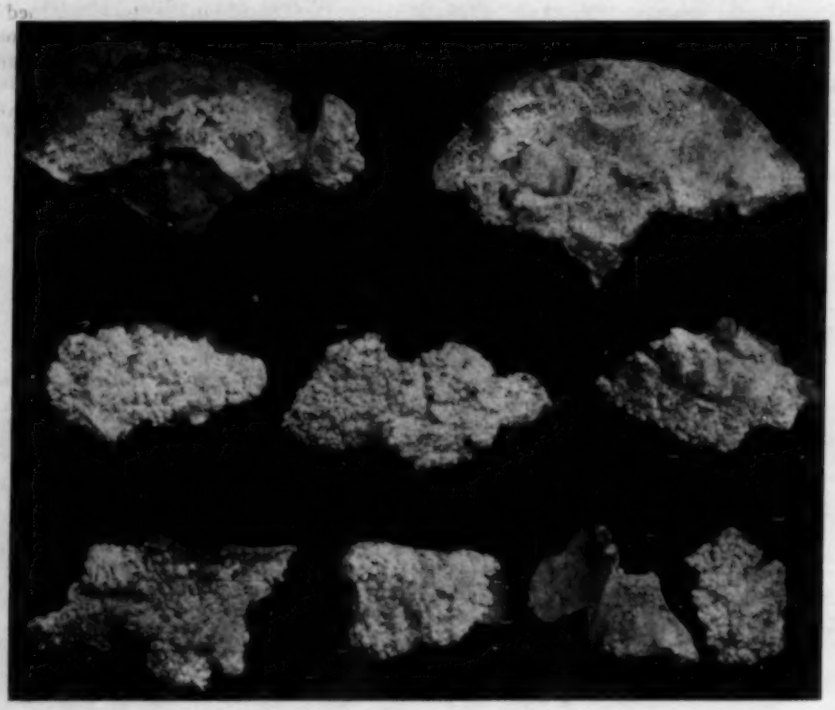


FIG. 1—WHITE CRYSTALS FROM COOLING PLATES ABOVE MANTEL

The first installment of a paper to be read at the February meeting of the American Institute of Mining Engineers, New York. The author is superintendent of blast furnaces, Bethlehem Steel Co., So. Bethlehem, Pa.

much lower alkali content than the local by-product coke made from West Virginia coals.

It may be a matter of some surprise to note that, with one exception, the soda contents of all the iron ores, the coke and the flux, subsequently listed, are much higher than the potash contents.

Before presenting any analyses, it may be mentioned that the difficult analytical determination of potash and soda, and the complete analyses of the various miscellaneous samples, were executed almost entirely by two expert analysts, who literally spent several weeks in this work. Most of the determinations were duplicated to insure their accuracy.

Table I shows analyses representing three months' shipments in 1916, including hundreds or thousands of carloads of each variety, of the chief materials charged into the blast furnaces. Besides the alkali metals, percentages of silica and alumina are given, also iron contents of the iron ores, all analyses being expressed on the "natural" basis.

In the course of this investigation, samples of slag and flue dust from all of the Bethlehem furnaces were collected continuously over a period of four weeks during June and July, 1916, and analyzed for the alkalies. The analyses in Table I of ores, fuel and flux, are fairly representative of the materials charged during this period. The same coke and stone, the latter being half limestone and half dolomite, are used in all the furnaces. The percentages of potash and soda in the ore mixture charged in each furnace during the above period are as follows: K_2O in ore mixture, in furnaces *A, C, D, E, F* and *G;* 0.28, 0.27, 0.28, 0.29, 0.28, 0.28 per cent respectively; Na_2O in ore mixture in furnaces *A, C, D, E, F* and *G;* 0.63, 0.43, 0.65, 0.50, 0.51, 0.63 per cent respectively.

Table I.

Analyses of Materials of Blast-Furnace Charge

Iron ores.	Kind.	Source.	Fe	SiO_2	Al_2O_3	K_2O	Na_2O
Tofo	Magnetite.	Chile	65.0	2.7	0.9	0.21	0.48
Juragua	Magnetite.	S. Coast Cuba	54.5	13.0	2.7	0.29	0.77
Mayari	Limonite..	N. Coast Cuba	38.0	2.0	10.0	0.06	0.25
Swedish	Magnetite.	Northern Sweden	66.0	2.8	1.1	0.27	0.82
Port Henry Conc.	Magnetite.	Northern New York	63.5	4.4	1.8	0.28	0.68
Harmony Cobbed	Magnetite.	Northern New York	63.0	10.0	3.4	0.25	0.55
Barton Hill	Magnetite.	Northern New York	64.0	8.3	1.9	0.22	0.77
Cheever	Magnetite.	Northern New York	59.5	11.4	1.0	0.21	0.92
Sterling	Magnetite.	Southern New York	55.0	8.6	2.0	0.33	0.95
Manganate	Hematite..	Lakes, Menominee	45.5	7.2	3.3	0.24	0.47
Norman	Hematite..	Lakes, Gogebic	55.5	5.4	1.5	0.29	0.32
Eureka	Hematite..	Lakes, Gogebic	54.5	7.1	1.5	0.26	0.35
Mary	Hematite..	Lakes, Marquette	50.5	7.8	2.5	0.28	0.55
Manganese Ores:							
Brazilian		Brazil	....	7.5	3.0	0.88	0.21
Cuban		S. Coast Cuba	....	...	...	1.12	0.77
Oriental		India	....	...	...	1.68	0.19
Fuel:							
Lehigh byprod. coke		West Virginia Coals	....	5.1	3.4	0.28	0.30
Flux:							
McAfee limestone		Northern New Jersey	....	2.5	0.9	0.36	0.70
Average dolomite		Bethlehem vicinity	....	3.5	1.5	0.82	0.97

Two or three of the above ores are mixtures of magnetite and hematie, with the former predominating.

From the foregoing data, and from known weights of materials charged, Table II has been constructed, showing the weights of potash and soda charged per ton of pig iron produced.

The ratio of potash to soda is considerably higher in the coke than in the ore and stone. From Table II it will be seen that for each ton of pig iron produced, nearly 60 pounds of the alkali oxides are charged, constituents which certainly are of considerable importance in the working of the furnace, yet of which relatively little cognizance has been taken in the past.

However, due largely to the relatively high percentage of alkalies in the fuel and flux, and on account of the considerable quantity of alkali-bearing flue dust removed, it is the opinion of the author that more potash and soda are charged into the Bethlehem blast furnaces, per unit of iron produced, than in any other large plant in this country.

It is probable that a considerable part of the potash and soda charged into a blast furnace is evolved from the top by direct volatilization or heat decomposition, though alteration by chemical reaction of the alkaline

FIG. 2—YELLOWISH AND YELLOWISH-RED CRYSTALS FROM COOLING PLATES ABOVE MANTEL

Table II.

Potash and Soda Charged Per Ton of Pig Iron Produced

	—Potash (K_2O)—			—Soda (Na_2O)—		
	Gross ton.	Pounds.	Per cent of total contributed.	Gross ton.	Pounds.	Per cent of total contributed.
Average weight in ore mixture, all furnaces, per ton pig.....	0.0046	10.3	46	0.0092	20.6	58
Average weight in coke all furnaces, per ton pig.....	0.0026	5.8	26	0.0028	6.3	18
Average weight in stone, all furnaces, per ton pig.....	0.0028	6.3	28	0.0039	8.7	24
Total	0.0100	22.4	100	0.0159	35.6	100
Ratio potash to soda charged...	1:1.6					

salts or compounds liberated may occur before they have left the furnace. It is certain that a large part of the alkalies are carried down into the hotter zones of the furnace and are converted into cyanides by reaction with red-hot carbon. Some investigators have attributed an appreciable part of their ore reduction to the action of cyanides, inferring that after being oxidized and driven to the cooler upper portion of the furnace, they condense and are again carried down into the reducing zone. Whatever the action, it is self-evident that eventually the same amount of alkalies must be carried out of a furnace that is charged, and this takes place through the following avenues of escape:

1. *In Chemical Combination in the Slag.*—The literature is almost barren with reference to the presence of alkalies in blast furnace slag. On account of the readiness with which the compounds of these metals are sublimed and carried out of the furnace with the gas, it might be inferred that only a negligible proportion would be found in the slag. This is far from the truth. Average samples from each of six furnaces in operation for two bi-weekly periods were carefully analyzed for potash and soda, with the results shown in Table III. The slags were all normal for this practice, averaging about 35 per cent silica, 13 per cent alumina, 13 per cent magnesia and the remainder lime, etc. In order to give an idea as to the hearth temperatures, the average silicon contents of the pig iron produced over the same periods are also tabulated.

The calculated weight of slag produced during this period was about 0.52 ton per ton of pig iron produced, which would account for the loss of alkalies as follows: Average potash loss in slag per ton of pig was 4.5 pounds, or 20 per cent of total charged; the soda loss in slag per ton of pig was 6.3 pounds or 17 per cent of the total charged.

The percentage loss of the two alkalies in the slag is seen to be about the same, being somewhat greater in the case of potash.

In the case of *C* furnace, almost the same weight of alkalies was charged and the same weight of slag was produced per ton of iron, as at the other furnaces, yet it will be noted that the percentages of alkalies in the slag is much lower. This probably may be attributed to the higher hearth temperatures, as indicated by the higher silicon iron produced. This theory cannot be generalized because further data are lacking at present.

On old blast furnace slag dumps, deposits of a yellowish or almost white substance frequently may be found in sheltered crevices or small grottoes, into which water has percolated through overlying masses of slag, this becoming more or less charged with soluble salts. The substance left by evaporation may be in the form of stalactites, thin acicular crystals, or of a dry powder. Considerable quantities of this material may be seen at Bethlehem where portions of the slag dump are being removed for concreting and other work. Two representative samples, one of light-yellow material, and the other nearly pure white, were obtained and after being dried, were found to have the approximate composition:

	White.	Yellow.
SiO_2	0.20	0.38
Fe_2O_3 + Al_2O_3.....	0.36	0.13
MnO	0.04	trace
CaO	26.47	17.60
MgO	none	none
K_2O	8.66	17.64
Na_2O	4.27	8.76
Total sulphur	38.3	37.6
Sulphide sulphur	14.5	25.6
Cl	trace	trace

The above analyses are interesting and instructive. The presence of nearly twice as much potash as soda is noted in these samples, whereas in the raw slag the figures are almost reversed. The simultaneous presence of large amounts of potash, soda and sulphur indicate that, to a limited extent, the alkalies are efficient desulphurizers in the blast furnace.

2. *As Cyanide or Other Volatile or Inflammable Compound Through the Iron and Cinder Notches.*—Part of the fume arising from the molten iron, and especially from the slag running from the furnace, is undoubtedly alkali

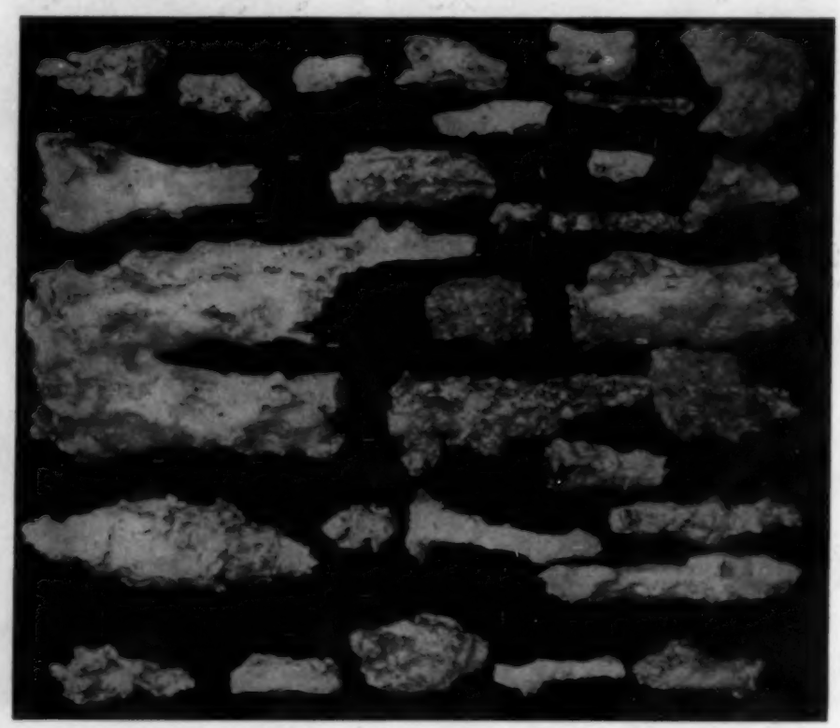


FIG. 3—WHITE "CYANIDE" STALACTITES FROM SHELL ABOVE MANTEL

compounds. There has often been noticed a peculiar lavender or violet flame around the iron and cinder notches during casting or flushing, which is probably due to some alkali salt or salts burning. The fume arising from the iron and cinder runners certainly contains a considerable percentage of alkalies.

3. *By Liquid Exudation or Decomposition from Gas Around the Tuyeres, Coolers, Mantel and Cooling Plates.*— Occasionally while removing a tuyere or cooler, a stream of liquid "cyanide", resembling water, will run out of the furnace, or can be seen exuding from the lining.

When cooling plates above the mantel burn out, due to the failure of the water supply, and a little gassing has commenced, beautiful white and yellow or yellowish-red crystals often build up around the apertures. In mass, all of these crystals appear to be strongly deliquescent, and hence it is difficult to obtain photographs showing clearly defined crystal faces, though the crystalline nature of the material is clearly apparent from Figs. 1 and 2. When examined on the hot furnace shell with a good hand glass, there is seen sometimes a mixture of different kinds of crystals and in different systems. Several samples of brilliant yellow crystals were secured and a few reddish-yellow which are very likely potassium ferrocyanide. Usually, however, the crystals are pure white, and have been found to be chiefly ammonium chloride. An analysis was made of some of these white crystals, slightly contaminated, taken from two different times, the results being: SiO_2, 0.78 per cent; Fe_2O_3 + Al_2O_3, 2.49; CaO, 0.29; MgO, 0.28; K_2O, 0.24; Na_2O, 0.12; Cl, 62.39; CO_2, 0.72; CN, none; NH_4, 30.69 per cent.

Liquid material sometimes also exudes from around the mantel plates and solidifies in heavy columns or stalactitic masses on the shell. This substance containing some cyannides, is highly deliquescent. Upon several occasions, samples which have been brought into the office in the evening have disappeared into puddles of liquid during the night. Fig. 3 shows some fine specimens. A fairly complete analysis of this material showed the following complex composition: SiO_2, 1.11 per cent; Fe_2O_3 + Al_2O_3, 3.17; CaO, trace; MgO, 0.22; K_2O, 46.15; Cl, 16.94; Na_2O, 18.08; CO_2, 9.64; CN, 7.84; NH_4, none; $Fe(CN)_6$, 5.25; CNS, 0.17 per cent.

The dissimilarity between the composition of this material and the crystals is striking. The excess of potash over soda is noteworthy, as is also the presence of considerable percentages of chlorine in both stalactites and crystals. As will be seen from later analyses of flue dust, an appreciable amount of chlorine, doubtless practically all charged, is carried out of the top of the furnace. Although no special investigation has been made, it is believed that some of it originates in the coke, which is quenched with water rich in chloride; also, it is doubtless carried by some of the ores as chlor-apatite or other chlorine-bearing mineral.

Table III.

Potash and Soda in Slag

Furnace.	Period inclusive.	Per cent alkalies in slag. K_2O.	Na_2O.	Per cent silicon in pig iron.
A	9/25 to 7/6	0.48	0.96	1.07
A	7/9 to 7/22	0.38	0.70	1.06
C	9/25 to 7/6	0.17	0.22	1.62
C	7/8 to 7/22	0.18	0.22	1.70
D	9/25 to 7/6	0.42	0.36	1.22
D	7/9 to 7/22	0.40	0.40	1.20
E	9/25 to 7/6	0.56	0.60	1.50
E	7/9 to 7/22	0.65	0.66	1.35
F	9/25 to 7/6	0.29	0.36	1.27
F	7/9 to 7/22	0.40	0.64	1.27
G	9/25 to 7/6	0.34	0.68	1.27
G	7/9 to 7/22	0.35	0.72	1.05
Average for all furnaces, first period		0.38	0.53	1.32
Average for all furnaces, second period		0.39	0.56	1.29
Average ratio potash to soda in slag				1:1.4

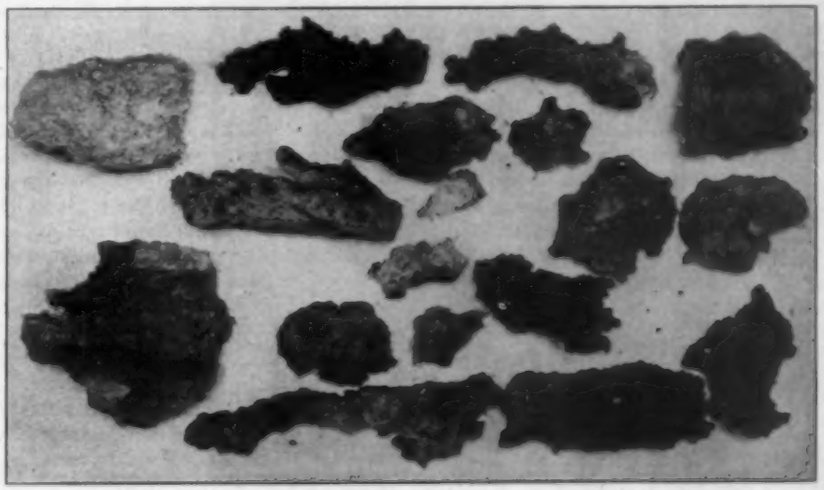


FIG. 4—STALACTITES, RESULTING FROM DRIPPINGS FROM GAS MAINS

Whereas certain other investigators have shown considerable percentages of cyanide compounds in dust samples collected through the shell of the blast furnace, or from the flue dust, only the last-mentioned sample, of all collected in this investigation, has shown more than a trace of cyanide. While probably present in considerable quantities in the hearth and bosh, the alkali cyanides forced into the upper zones are evidently almost entirely decomposed before leaving the furnace.

In the case of one furnace which has recently completed a long campaign, most of the cooling plates above the mantel burned out because of failure of water at one time or another. After the wall had worn thin, it was necessary to use a spray cooling pipe on the outside of the shell. To prevent water from entering the furnace, the feed-water pipes were cut off and the holes through the shell covered with "scab" plates on top of asbestos pads. After several months, when these plates were removed, it was found that some of these asbestos pads were dyed deep yellow, and several showed greenish and bluish tinges, indicating complex cyanides. When an old furnace is laboring under high pressure, and is seen to be gassing freely about the mantel, a strong acid odor, doubtless ammonium chloride, is sometimes evident.

4. *By Combination with the Brickwork or as an Accretion in the Form of Cyanide, etc., and Removal When the Furnace is Blown Out.* — This is of course, a relatively small but very

Table IV.

Analyses of Dust-Catcher Flue Dust

Furnace.	Period inclusive.	Fe.	Ign. loss.	CN.	Total. K_2O.	Total. Na_2O.	Water. Soluble. K_2O.	Water. Soluble. Na_2O.
A	9/25 to 7/8	40.7	17.3	None	0.63	1.45	0.40	0.35
A	7/9 to 7/22	47.2	11.5	None	0.64	1.47	0.27	0.16
	9/25 to 7/8	59.8	1.7	None	0.50	0.94	0.29	0.30
C	7/9 to 7/22	53.8	8.8	None	0.69	1.07	0.24	0.16
D	9/25 to 7/8	40.5	18.1	None	0.59	1.30	0.40	0.42
D	7/9 to 7/22	43.3	12.9	None	0.88	2.10	0.29	0.22
E	9/25 to 7/8	49.3	9.8	None	0.50	0.90	0.31	0.30
E	7/9 to 7/22	46.3	16.4	None	0.54	1.10	0.17	0.20
F	9/25 to 7/8	46.6	14.6	None	0.42	0.85	0.20	0.22
F	7/9 to 7/22	50.6	8.9	None	0.59	1.20	0.22	0.18
G	9/25 to 7/8	47.4	8.1	None	0.55	1.50	0.25	0.20
G	7/9 to 7/22	43.3	12.2	None	0.87	1.60	0.29	0.24
Average for all furnaces first period					0.53	1.16	0.31	0.30
Average for all furnaces second period					0.70	1.42	0.25	0.20
Average for all furnaces both periods					0.61	1.29	0.28	0.25
Ratio average total potash to average total soda						1:2.1		
Ratio average water-sol. potash to av. water-sol. soda						1:0.9		
Ratio average water-sol. potash to av. total potash						1:2.2		
Ratio average water-sol. soda to average total soda						1:5.2		

interesting part of the alkalies charged during a campaign. Several authors have suggested that destruction of brickwork in certain stacks, particularly in the middle and upper zones, was due to action of alkalies. However, so far as chemical action is concerned, rather more importance has been attributed to reaction between carbon monoxide and iron oxide spots in the brickwork, with subsequent disruption of the brick mass. The destruction of linings is doubtless hastened somewhat in furnaces in which the burdens are relatively rich in alkalies.

The average sample of the hearth brick used in one furnace lining at Bethlehem by careful analysis showed a total alkali content of 1.60 per cent. After blowing out, a sample was secured of a number of these brick near the bottom of the hearth, appreciably discolored when broken, which showed a total alkali content of 3.36 per cent. Higher up in the lining the alkali enrichment is greater. Samples of pure white, mixed cyanides, etc., have been recovered in various plants from protected crevices in the brickwork, around the boshes after furnace campaigns, and a great deal more would be found if the contents of the stack could be removed dry.

The presence of ammonia around furnaces directly after being blown out is, of course, well known. Sometimes enormous quantities are evolved, the odor being apparent until the entire lining is removed and the hearth cleaned out. The chief source of ammonia gas is without doubt the alkali cyanides and ammonium chloride which decompose in the hot water or water vapor introduced to cool down the furnace. In passing, it is interesting to recall that a very small part of the cyanide produced in a furnace is fixed and carried down in the salamander in the form of the peculiar compound, titanium cyanonitride. The excess accumulation of alkalies in the brickwork, or in salt deposits in a furnace lining after a campaign, may literally amount to several tons.

5. *By Evolution in the Gas.* — The heavy flue dust which is carried out of the top of the furnace by the gas current, of course, contains approximately its normal percentage of alkalies. The finer portions of ore, stone and coke dust doubtless average somewhat higher in alkali content than the entire materials as charged. All the remaining potash and soda in the burden, not previously accounted for, is sublimed and passes out in the form of various salts or compounds as a fine fume.

Various investigators have studied blast furnace flue dust with special reference to its potash content, but almost entirely from a scientific standpoint. It is true that at least one American and one foreign patent have been issued for recovery of potash in flue dust, but no evidence has been found that any practical application has thus far been made. And, so far as can be ascertained, the first commercial disposition of the flue dust as a fertilizer was made at Bethlehem somewhat more than two years ago.

The progress of the alkalies in this practice will now be traced from the furnace top, through the gas mains, washers, stoves, boilers and stacks.

Besides the dust carried out by the relatively small amount of gas escaping from the furnace top, and the insignificant quantity permanently deposited along the mains, all the dust under the above heading is removed from the dust catcher. Representative bi-weekly samples of the dust-catcher flue dust were taken over the same period during which the slag samples were secured and analyzed with the results shown in Table IV.

A much greater percentage of the total potash than of soda is present in a water-soluble condition.

The entire absence of cyanides in this dust, and even in concentrated alkaline samples, recovered further along in the gas system, furnishes further corroboration of the fact that in normal operation practically no cyanide is carried in the gas current from the furnace top. It may be an occasional constituent of flue dust, because of abnormal furnace conditions.

It will further be noted that there is a considerable enrichment of this flue dust by the alkali fume. At one furnace where dry gas is used in the stoves, there are two Brassert Witting dry whirlers and a long dry dust main with numerous dust legs between the dust catcher and stoves. This dust is increasingly fine and somewhat lighter in color at each of the points removed. Potash determinations at different times have shown a gradual increase in the successive samples, running as high as 5 per cent at the stove burners.

Tests made at different times show that the dust catchers remove an average of about 100 pounds of dust per ton of pig iron produced. Using the average percentage of alkalies in flue dust for the four weeks' period, it is found that the average potash in the flue dust from dust catcher per ton of pig was 0.6 pound or 1.8 per cent of the total charged; the average soda in the flue dust from dust catcher per ton of pig was 1.3 pounds or 2.3 per cent of the total charged.

The ratio of total potash to total soda present is roughly about the same as in the average charge entering the furnaces.

(*To be concluded*)

Ships for Bauxite

In the past year there has been considerable excitement in Dutch Guiana due to the discovery of large deposits of bauxite on the Surinam river, some hours' journey from Paramaribo, and also on the Demarara river in British Guiana. The Aluminum Co. of America is already developing deposits and arranging for transportation to the United States coast and gulf ports. One ship has already been purchased and will be taken to the coast at the opening of navigation this year. Alterations to fit the vessel for the trade are under way.

Fig. 1—Interior view of foundry of Racine Steel Castings Co.

New Electric Steel Plant in Wisconsin

SUCCESSFULLY producing electric steel castings has been the subject of much experimenting during the past few years. Not every attempt to make good castings has been rewarded by success, although the experience gained in early failures has been put to such good use that now foundrymen are not confronted by many of the difficulties faced by the pioneers in the business. High-grade castings can be made at a cost which enables them to be marketed at a profit.

An instance of the certainty with which the making of castings from steel produced in the electric furnace may be undertaken is found in the new venture of the Racine Steel Castings Co., Racine Wis., owned and operated by the Belle City Malleable Iron Co. This company formerly operated a small crucible steel plant, which became idle when the demand for crucible steel began to disappear. The electric steel plant has been built to take its place. The foundry is operating a 3-ton heroult furnace economically, uniform steel is produced and costs are below expectations, although the plant is active only during daylight hours. Difficulty in obtaining sufficient labor has prevented 24-hour operation, which would materially reduce production costs from the present figure.

The furnace, shown in Fig. 2, is equipped with three 14-inch carbon electrodes, each 7½ feet long. The furnace walls are lined with magnesite brick and the bottom is of dolomite, while the roof is of silica brick. Three heats are being poured each day, at 7 and 11 o'clock in the morning and 5 o'clock in the afternoon. Six heats could be poured if the furnace were operated 24 hours.

The 3-phase, 60-cycle current received from the feed wires at 13,200 volts, is stepped down to 100 volts for the furnace, which actually uses it at about 90 volts after losses are deducted. The reduction is effected by three single-phase air-cooled transformers, each with a capacity of about 250 kilovolt-amperes. The consumption of current per ton of metal has been satisfactory from the beginning and has been lowered materially as production has been built up. The charge consists of 6,000 pounds of metal, made up of 1,500 pounds of punchings containing about 0.18 to 0.20 carbon, 3,000 pounds of cut scrap and 1,500 pounds of sprues and other cast scrap from the foundry. To this is added about 150 pounds of lime, which forms a basic slag and takes up the phosphorus. About 45 minutes before the steel is poured this slag is tapped off and 150 pounds of lime

FIG. 2—THREE-TON HEROULT ELECTRIC FURNACE

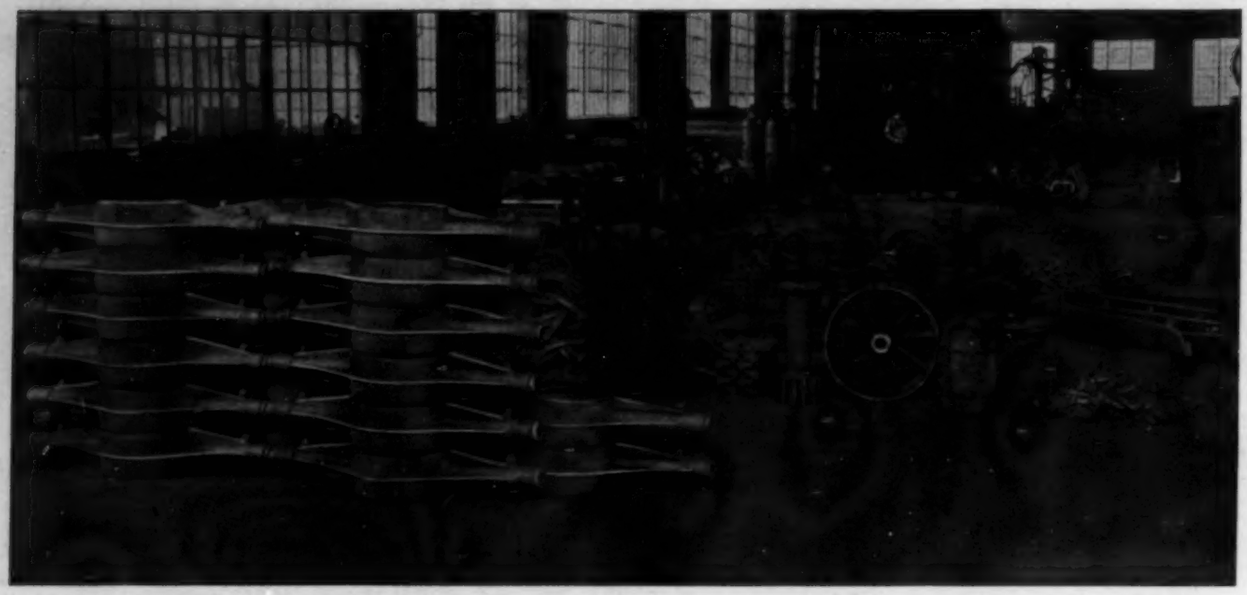


FIG. 3—GROUP OF FINISHED CASTINGS SHOWING VARIETY OF WORK TURNED OUT

and 25 pounds of coke breeze are added, forming a calcium carbide in the slag, which combines with and removes the sulphur.

When the charge has been melted and rabbled, before the first slag has been removed, a test ingot is taken and the carbon content determined. If the carbon is too low, malleable pig iron is added to restore that element, and if it is too high, iron ore is added to reduce the percentage. The preferred practice is to have the carbon low and bring it up, but sometimes a piece of an electrode breaks off and unites with the charge, bringing the carbon to an excessive percentage. Just before the metal is tapped, ferro-manganese and ferro-silicon are added to bring the metal to the particular desired analysis. Steel of a typical analysis, which is approximated within narrow variations, contains 0.20 per cent carbon, from 0.50 to 0.60 per cent manganese, 0.25 to 0.35 per cent silicon, 0.03 to 0.035 per cent sulphur, and 0.02 per cent phosphorus. The percentage of sulphur and phosphorus is controled almost absolutely, but the proportion of the other constituents may vary slightly.

Complete fusion is obtained in about 2½ hours on a cold bottom and in two hours on a hot bottom. Full three tons of steel are obtained each heat in actual practice and no effort has been made to increase the melt.

The steel is poured into a 2-ton crane ladle, in which it is conveyed to the molding floor and there poured into hand ladles. To keep the metal hot enough for pouring small molds and thin sections, the steel is divided into two or three portions, the surplus being kept hot in the furnace under the current. This causes some loss of time before the furnace can be recharged, but this handicap will be overcome by later practice. No difficulty has been experienced in pouring the thinnest sections under this plan, as hot steel is always available.

Hand molding is used exclusively, air rammers being the only mechanical aid employed. After the castings are shaken and the sprues cut off, they are cleaned by means of sand blast equipment installed by the Pangborn Corporation, Hagerstown, Md. The

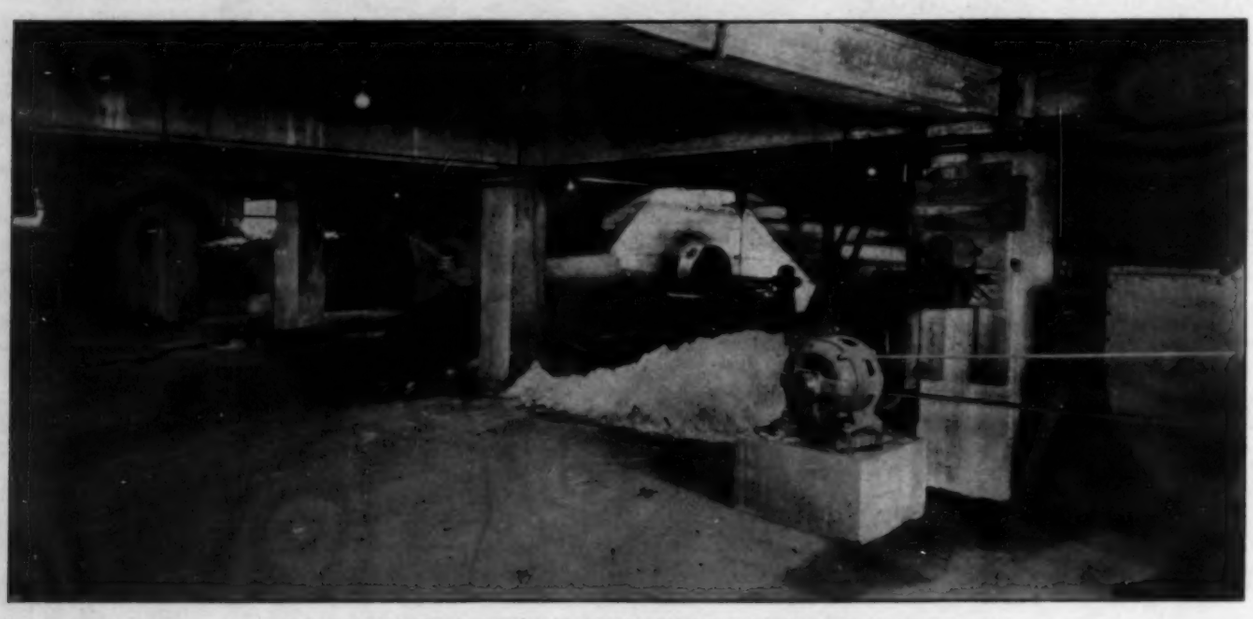


FIG. 4—SAND MIXING AND STORAGE FACILITIES IN BASEMENT

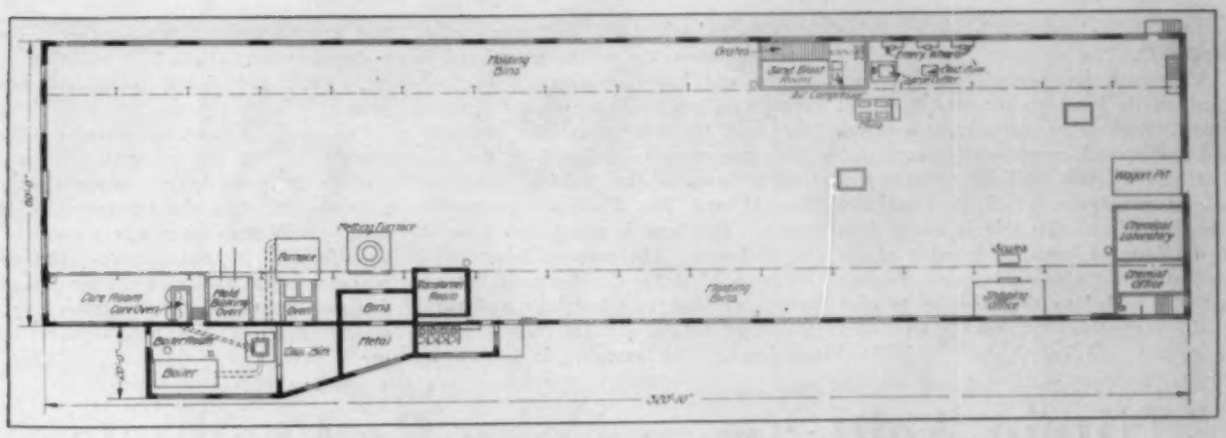


FIG. 5—PLAN OF FOUNDRY SHOWING ARRANGEMENT OF DEPARTMENTS

air compressor, built by the Chicago Pneumatic Tool Co., Chicago, has a capacity of 150 cubic feet per minute, and is driven by a 75-horsepower motor. It furnishes air to the sand blast, chipping tools and rammers. In the same room with the air compressor is a 50-horsepower motor, operating a line shaft leading to the tumbling barrels, grinders and other tools.

The line of work already undertaken includes gas tractor, motor car and general machinery castings. The plant is of steel and brick, 80 x 322 feet, with a central bay, 50 feet in width, served by a 7½-ton electric traveling crane. The side bays are 15 feet wide. A basement, extending the full width of the building and about 100 feet long under the shipping room, is used for the preparation and storage of sand. The prepared sand is picked up in large buckets by a crane, lifted through hatches to the upper floor and then conveyed to the molding floor. The used sand is returned by a similar process. The sand-mixing machinery is shown in Fig. 4, which indicates the general arrangement of the basement.

Foundry Has Modern Facilities

A general view of the foundry is presented in Fig. 2, the electric furnace being seen about two-thirds of the distance down the room. The air compressor room is at the center of the right wall, with the sand blast equipment a step nearer the observer and the grinders in the foreground. The large area of sash in the side and monitor walls provides adequate light in all parts of the foundry building.

A number of typical castings made in this plant are shown in Fig. 3. The automobile axle housings piled at the left form an interesting example of the possibilities of electric steel, the walls of the casting being unusually thin and of uniform section. Castings from a few ounces to one and a half tons are represented in this illustration.

Making Magnesioferrite Synthetically

THE far-reaching effect of the European war upon the American industries may be realized only through an intimate insight into the widely diversified branches of activities in this country. The layman, reading popular magazines, is of course familiar with the intrinsic benefits that manufacturers have derived from the orders placed with them by the belligerents, but very few, however, appreciate the immeasurable advances in science which were instigated when the outbreak of war cut off the imports to American manufacturers. In some cases the manufactured article had to be duplicated in this country while in others, the raw or semi-raw product had to be replaced by the efforts of Yankee ingenuity. The failure of the supply of imported refractories for lining open hearth and similar furnaces will serve to illustrate one instance where science promises to solve a difficult problem and temporarily at least to replace the foreign goods with those of domestic manufacture of a satisfactory quality.

The construction and operation of furnaces for refining metals and for various metallurgical purposes call for the use of refractory linings to resist the extreme temperatures. The choice of the refractory material is dependent upon the kind of metal to be treated and also upon the temperature at which the furnace is to be operated. Among the materials used for lining furnaces to resist the high temperatures of boiling steel may be mentioned magnesium carbonate, chromium rock containing a percentage of iron ore or a mixture of magnesium and calcium carbonates commonly known as dolomite. These refractories are either placed in the furnace in the form of bricks or are formed into a lining from the bulk grain by melting. The chief objection that has been found with these materials is based upon their liability to attack by molten slag at high temperatures. It has been shown, however, that if the magnesia has been combined chemically with iron before being used in the furnace it will afford greater resistance to the chemical action of the molten metal because its affinity for the substances contained in the hot metal has already been partially satisfied. Refractories of this character were imported from Austria before the war broke out.

The Austrian magnesite, containing after calcining about 5 to 10 per cent of iron oxide, comes from one of a few deposits which are to be found so far as is known only in the Dolomite and Carpathian mountains. This is a natural magnesioferrite ore. Carbonate of magnesia is found in Greece, California and Canada. Some attempts have been made to combine this refractory with other iron-bearing refractories, but on account of the variation of the iron content, it has been difficult to secure uniform mixtures and consequently the life of such furnace linings has been very uncertain.

In speaking of this ore it is interesting to note that in common parlance it is the custom to refer to all magnesia ores as magnesite regardless of the chemical composition. This practice is often misleading. Dana, an eminent metallurgist, has pointed out that ores similar in composition to the Austrian ore, containing definite percentages of iron and having strong magnetic properties, should properly be called magnesio-

ferrite—the chemical formula being $MgOFe_2O_3$.

A process for reproducing this ore synthetically has been patented by C. B. Stowe, Rockefeller building, Cleveland, and has proved commercially successful. The basis of this artificial refractory is natural magnesite which is practically free from iron. To this is added iron in the form of hematite or other ore in the form of rolling-mill scale. Enough water is added to the mixture to give it the consistency of mud. The mud is molded and baked until it is hard enough to withstand the pressure of stacking when the molds are placed in a kiln and baked, driving off the carbonic-acid gas and water and causing the iron to unite with the magnesia. The temperature employed in the kiln ranges between the melting points of No. 11 and No. 19 Seger pyrometric cones. This heat is maintained from 36 to 48 hours. The process, however, is not completed by one burning, but requires at least two burnings and three grindings before a satisfactory brick is produced. The material is broken up and ground before each burning. The material when crushed is suitable as grain bulk for linings after the first baking.

One of the greatest advantages of this process is that the percentage of iron may be regulated to suit any particular purpose for which the furnace is to be used. Such regulation was almost impossible with the natural ore. The appearance and analysis of the manufactured magnesioferrite resembles very closely that of the natural Austrian ore.

Nitric Acid From Coke By-Products

THE present war in Europe, coupled with the lack of military preparedness in the United States, is in a great measure responsible for the intense interest in this country at present in the question of nitric acid and nitrogen preparedness. The recent legislation of congress, upon the advice of naval and military authorities, providing for an investigation of the matter and ultimately for the building of a government nitrate plant, has called for a presentation of statistics regarding our possible nitrogen sources. The supply of fixed nitrogen from our by-product coke ovens and gasworks retorts is very much larger than has been generally appreciated, and its relative importance has not been properly understood by the general public nor by some members of the law-making bodies. That a large amount of confusing and misleading information has been put forth from certain quarters is a matter of common knowledge among the better informed portion of the public. A part of this information was unquestionably due to ignorance.

The sustenance of plant and animal life is dependent upon the supply of absorbable nitrogen; the destruction of life in war requires for its accomplishment the use of fixed nitrogen in high explosives. The recent finding of the United States geological survey that the nitrate deposits of this country are practically worthless for commercial utilization requires that we turn to ammonia as the most available source of nitric acid if we are to be industrially independent. Under normal conditions of peace, nitric acid is derived from the Chile saltpetre of commerce KNO_3, shipped from the valuable beds in South America. It may also be obtained by direct fixation from the air by employing an electric arc. The most remarkable developments in this process have taken place in the last two years in Germany, and today that country has a nitrogen industry, producing 140,000 tons of nitric acid per year.

By-Product Ammonia Supply

The manufacture of coke by the distillation of coal in by-product ovens and in gas retorts, in this country, furnishes some 88,500 tons of ammonia per year, according to the statements of H. C. Porter, of the H. Koppers Co., Pittsburgh, published in the Oct. 12 issue of *The Iron Trade Review*. The plants under construction will increase the foregoing figure to about 126,500 tons by the end of 1917. This quantity of ammonia can be converted into 404,000 tons of 95 per cent HNO_3. Deducting for the present consumption of ammonia for all purposes, the remainder, if converted into nitric acid, would yield about 180,000 tons of the 95 per cent product—a great deal more than the amount which, it is estimated, would be required for the emergency of a war. In September, 1916, there were 6,756 completed by-product coke ovens in the United States with an annual capacity of 75,950 tons of ammonia as NH_3. The ovens under construction total 2,236, with an annual capacity of 37,810 tons of amonia.

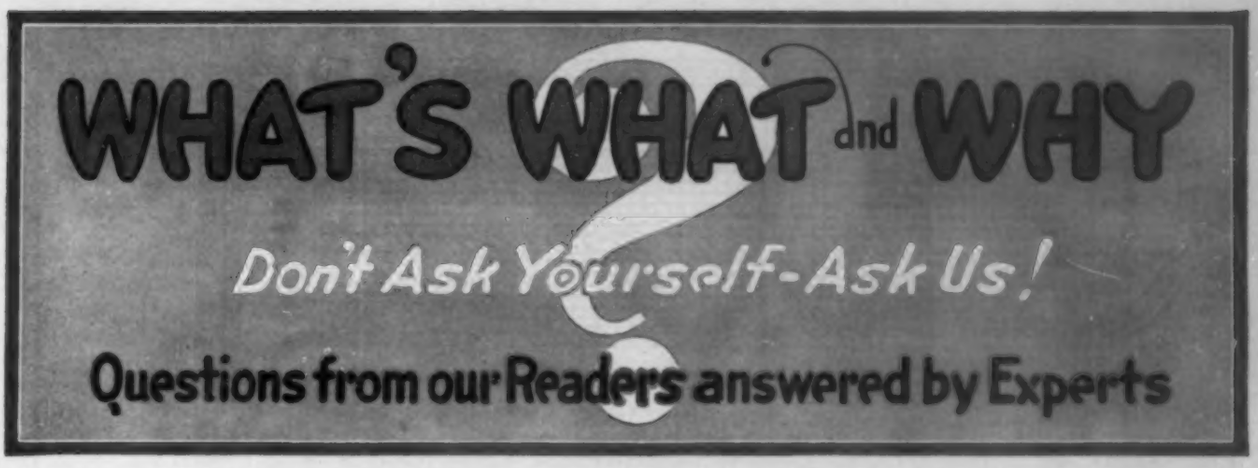
It should be definitely clear that an ample ammonia supply far beyond our present or future war needs can be readily secured from the coke industry alone. The fact that these by-product plants are scattered about the country is important in connection with the problem of the transportation of the ammonia to the plants which will use it for conversion into nitric acid. The proposed location of the government plant at Mussel Shoals, Tenn., to supply all the nitric acid needed to protect the country in time of war, is another example of the hysterical legislation so peculiar to the recent congress in technical matters. It is comparable only to the puerile haggling over the Niagara Falls power situation recently, and again demonstrates the need of mechanically and chemically trained engineers, in legislative bodies.

Scherbius System of Mill-Motor Control

A report of a meeting of the Cleveland section of the American Institute of Electrical Engineers, published recently in *The Iron Trade Review*, contained several misleading statements according to J. D. Wright, of the General Electric Co., who presented a paper on control of mill-drive motors. He submits the following which we are glad to publish:

"After discussing the more simple forms of control, such as rheostatic control, and pointing out how this was unsuitable for use in operating induction motors under the conditions imposed by steel mill service Mr. Wright briefly described the Kraemer or rotary-converter system of obtaining speed adjustment of the induction motor driving the mill. This system permits operation of the main motor only at speeds below the synchronous speed. He then described in detail a modification of the Scherbius system which has been applied successfully and used by the General Electric Co. on a number of installation.

The modified Scherbius control system consists essentially of the slip-ring induction motor which drives the mill, a small exciter mounted on the mill motor shaft and an auxiliary motor-generator set, which at speeds below synchronism returns the secondary slip energy of the main motor to the power lines and at speeds above synchronism delivers electrical energy to the rotor of the main motor. This system permits operation of the main motor at speeds below, at and above synchronism with speed and torque characteristics the same as obtained when operating with short circuited slip rings."



Gray Iron Castings

We would like to know what, in the process of making gray iron castings from southern pig iron, will tend to make some of the castings hard and some soft, and some with hard spots in them? Does the time and temperature of pouring have anything to do with such irregular production? If the castings are left in the mold until cold will they be softer than when dumped from the mold immediately after pouring?

Low silicon or high sulphur or both will promote the production of hard castings; if the silicon is low, the carbon will remain in the combined state as the carbide of iron, Fe_3C, with a resulting hardness due to the inherent hardness of the combined form; sulphur hardens and weakens the iron and is undesirable in every way.

Manganese above 1 per cent begins to harden cast iron by promoting the retention of carbon in the combined form. Design has an important bearing on the successful production of good castings; the effects of corners, thin webs, sharp angles, to name the more important points, need the close and studied attention of the designer. Such places cool quicker and are therefore harder than the thicker parts of the same casting. Thin castings, unless slowly cooled, will be white and hard.

The time of pouring will have little effect, if any, on the kind of metal produced, unless the batch be cooled off unduly. Of course, there will be a small amount of surface oxidation with the production of oxide of iron, which will slag itself. High pouring temperature is conducive to the production of soft castings, *i. e.*, gray iron, because the longer time required for cooling will promote the separation of graphite. The question of hot pouring is, of course, allied with the problem of shrinkage and of gas exit. With hot metal the gases dissolved in the iron are more uniformly distributed throughout the casting.

When castings are left in the mold to cool, they cool much more slowly than when dumped immediately after pouring, and they will, therefore, be softer; the longer period of cooling will promote the throwing out of the graphite.

Reclamation of Tin

Is it practical for a manufacturer to reclaim tin from his own accumulation of dross?

It is exceedingly difficult to reclaim tin from dross. Two of the largest consumers in the country do not attempt to reclaim the metal from their own dross. The fact that this practice is not at all general among manufacturers is a forceable argument against such a procedure. Most manufacturers have found it economical and satisfactory to send their scrap material to a custom smelter.

Conviction of Strike Leaders

What, if any thing, has the supreme court of the United States done with regard to passing on the conviction of four leaders in the 1913 West Virginia coal strike?

The supreme court has recently refused to review the convictions of the four leaders, Fannie Sullens, Frank Ledvinka, James Oates and Hiram Stephens. They were sentenced to six months' imprisonment for contempt of court in failing to obey an injunction by the federal district judge. Judge Dayton held that the United Mine Workers was an unlawful conspiracy in its organization. The conspiracy case is set for reargument before the supreme court before the expiration of its present term.

Phosphorus in Ferro-Manganese

Please advise what is the phosphorus content in standard 80 per cent ferro-manganese.

Standard English ferro-manganese is guaranteed at 0.30 and under in phosphorus and 0.25 is about the average. Some of the domestic producers of ferro-manganese have been turning out an unusually low phosphorus metal and in some casts this has been down to 0.10. The manganese guarantee for standard ferro-manganese is 80 per cent. Some of the domestic makers have been able to produce certain casts as high as 83 per cent.

Increase in Price of Rails

What is the explanation of the increase in the price of steel rails from the established price which governed the market for many years?

By tacit agreement of steel rail mills and railroads about 15 years ago, the custom arose of keeping the price of standard steel rails at $28 per ton for bessemer and $30 per ton for open-hearth rails. Ordinary fluctuations in the market for finished steel did not go sufficiently far in either direction from 1.40c to 1.50c, Pittsburgh, to make much difference and the making of a fixed quotation seemed just to both interests. Under the unusual conditions prevailing in the steel market at present, the price of steel products has risen far beyond $30 per ton; in fact, to double that amount. An increase of $5 last spring and another of the same size in November brings the price of open-hearth rails to $40 per ton, still far below the price being obtained for other forms of steel. With the fixed price arrangement thus broken at this time, the future of steel rail prices is a matter of conjecture.

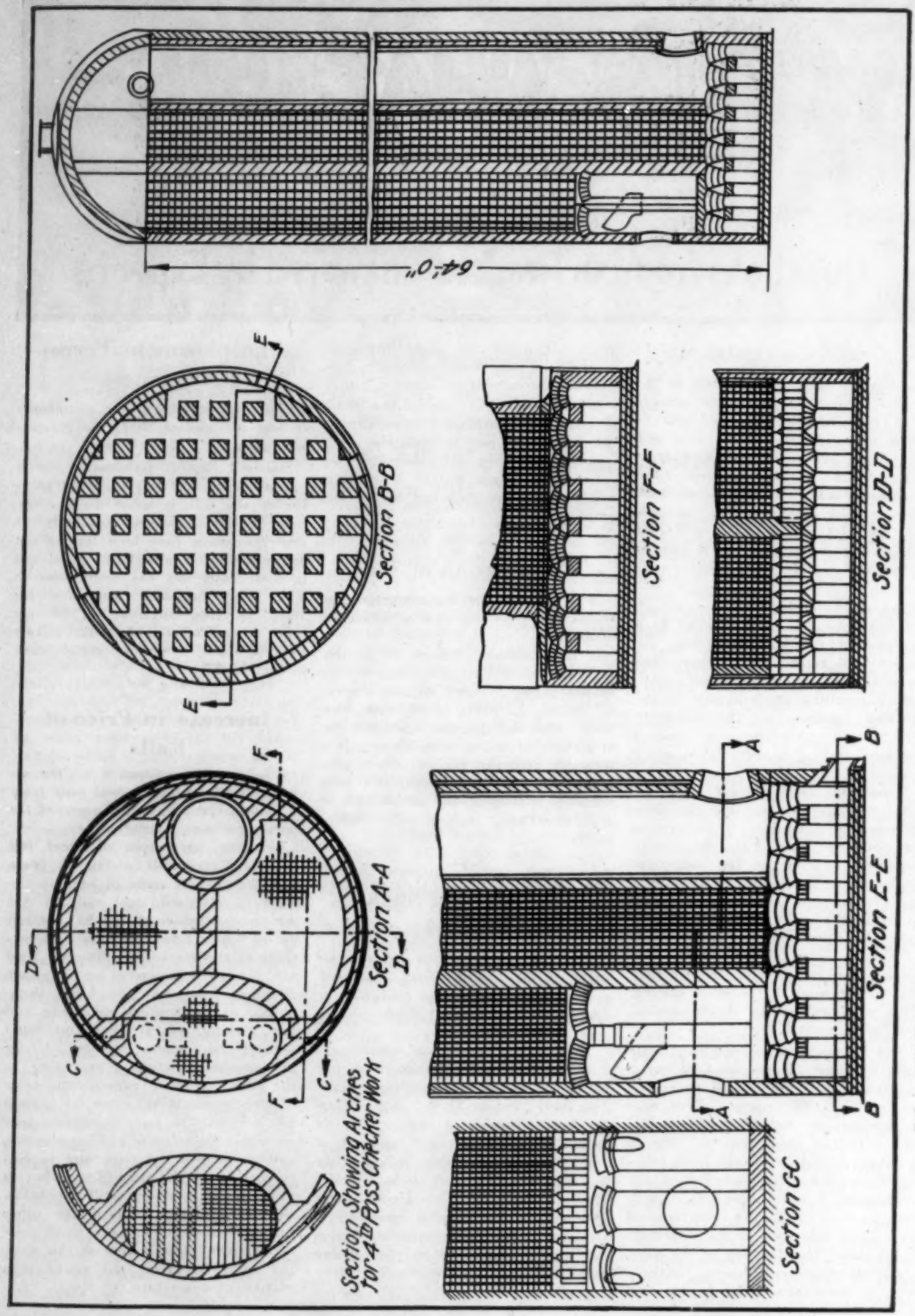


FIG. 4—GENERAL VERTICAL AND HORIZONTAL CROSS-SECTIONS THROUGH NEW STOVE OF THE ILLINOIS STEEL CO.

Modern Hot-Blast Stove Design–II

Recent Practice is to Make Checker Openings of Uniform Dimensions in Any One Pass—Changes in Combustion Chambers Have Resulted in Some Notable Improvements in Stove Efficiency

BY ARTHUR J. BOYNTON

THE calculated difference in weight of gas due to an assumed average difference in temperature of 50 degrees Fahr. corresponds to a difference in pressure of less than 0.02-inch of water for a stove 100 feet high, while the total drop in pressure through the checkers of a two-pass stove is an inch of water or more. The importance of buoyancy as determining distribution in the small upward passes of three and four-pass stoves, as built, probably is very small, but its action forms one of the arguments in favor of the two-pass stove.

A few years ago several two-pass stoves were built in which the checkers in the center of the pass were made smaller than those on the outside, the intention being to increase the friction in what was assumed to be the hottest part of the stove, and so to equalize distribution. This feature has not appeared in more recently built two-pass stoves, the positive advantage of building the checkers to to minimize dimensions outweighing the possible improvement in distribution. Recent practice is to make all checker openings and walls to uniform dimensions throughout a given pass, in square construction and in radial construction to come as near to this as practicable.

Equalizing Resistance

Equalization of frictional resistance presents its only problem of construction in the bottom and to some extent at the top of the stove. In two-pass, side-combustion stoves it is not practicable to make air and chimney openings, and supporting piers symmetrical with the checker space so as to give equal friction to the gas from all the checkers. In three-pass stoves and in some recently built two-pass, center-combustion stoves this construction is, generally speaking, symmetrical, but the symmetry is marred by the one or more hot blast and gas passages into the center of the stove.

In the side-combustion, two-pass stove the former tendency to build arches through the bottom of the stove, connecting to the checkers through ports whose varying dimensions were intended to equalize friction, has been generally abandoned in favor of pier construction in which no attempt is made to control the distribution, but which by large areas and small surfaces reduces the friction as low as possible. In this type of stove the chimney valves are usually two in number and set at an equal angle to the center line of the stove and as far apart as convenience will permit. The blast inlet is usually on the center line of the stove midway between the chimney openings.

Center-combustion, two-pass stoves, when provided with one chimney opening issuing from the side of the stove as formerly built, have apparently shown a poor distribution of air and gas, indicating a considerable effect of difference in frictional resistance. An attempt has been made to remedy this by two diametrically opposite chimney valves, connecting through two flues, one on either side of the line of stoves into a stack located on their center line. This construction was symmetrical outside the stove and a considerable improvement over the single valve from the standpoint of gas distribution, though it had no effect on the distribution of air.

Recent construction provides a generally symmetrical outlet for gas and inlet for air, by a central chamber at the bottom of the stove, with outside connections either through the side of the stove, as built by the Illinois Steel Co., or through the stove bottom, as built by the Carnegie Co. at the Duquesne Works.

The determination of the influence of the gas currents in the dome of the stove as influencing distribution is a difficult matter under high temperature conditions of actual service. Experiments have been made by A. N. Diehl in connection with the stove previously referred to which with an induced flow of cold air showed a maximum flow through the outer ring of radial checkers, the minimum flow being just outside the ring of checkers next the central combustion chambers with an increase in flow through this inner ring. An inclined baffle wall placed outside the checkers next the outer wall of the stove largely corrected this inequality under the same conditions of observation. The apparent conclusion from these experiments is that the gas current issuing from the combustion chamber continues upward and is deflected outward and downward by the dome. The same conclusion may be derived from A. E. Maccoun's experiments.

An exactly contrary view has been taken by other designers, whose object has been to prevent an unduly large flow of gas down the checkers next the combustion chamber. For this purpose the combustion chamber walls have been raised, both in center-combustion and side - combustion stoves. The wall is usually of a uniform height, but is sometimes varied. The newer two-pass stoves of the South works of the Illinois Steel Co. have a fan-shaped top to the combustion chamber wall reaching a height of 2 feet 6 inches at the middle of the wall. These changes in the height of walls have been made as a result of observation of apparent differences in temperature at the top of the stove. Bearing in mind that gas and air are discontinuous bodies, and that all movement of one as well as of the other is the result of pressure, it is difficult to account for a marked tendency for gas to be forced down the checkers next the combustion chamber in undue proportion.

Combustion Chamber

This chamber, with its dividing wall, formerly occupied nearly one-half the available space inside the side-combustion, two-pass stove. The reason for this is not apparent, since three-pass stoves built at the same time were successfully operated with a combustion chamber having less than half the area.

The area of the combustion chamber has been reduced in later stoves, and would doubtless have been reduced to its lowest terms, that is, a cylindrical opening located on one side of the stove, if it had not been for a natural conservatism on the part of the designers as to what the effect would be on the distribution of the

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The second installment of the paper "Progress in Hot-Blast Stove Design," presented at the recent St. Louis meeting of the American Iron and Steel Institute. The original paper has been revised by the author, who is superintendent of blast furnaces, National Tube Co,. Lorain, O.

gas into the checkers. The side-combustion chamber, therefore, retains much of its former shape and size. As a result of this condition, propositions to put checkers in the upper part of the combustion chamber have been frequent. This change has been attended with notable improvement in the case of some existing stove installations. As applied to new construction or complete relining it is readily apparent that no method of putting checkers in the combustion chamber can equal, from the standpoint of available heating surfaces, the reduction of the combustion chamber to an equivalent area and the resultant ability to utilize this space for checkers, which will extend the entire height of the stove instead of only a part of this height. Distribution of gas is therefore the only apparent reason for an enlarged combustion chamber containing checker work. The free area of the combustion chamber has been reduced to 26.6 square feet in a set of four two-pass, side-combustion chamber stoves at the South works of the Illinois Steel Co. This area has been proven to be ample through many years experience on three-pass stoves.

A very interesting use of space otherwise wasted in the combustion chambers is shown in the construction of the new stoves at Gary works. Here a saw-tooth construction on the inner side of the upper part of the combustion chamber wall is employed to increase the heating surface. This involves no corresponding reduction in the area of the checker since it makes use of the space above the skin wall in the lower part of the combustion chamber.

Structural strength of the combustion chamber walls, is of course at a maximum when the chamber is circular. Any displacement of the combustion chamber walls causes a serious displacement in the checkers. Recent construction, therefore, tends to approach a circle even in side combustion walls.

The increased friction due to smaller checkers, and in some cases to the practice of reducing the area of the combustion chamber by installing checker work has led to the adoption of forced draft for air or gas, and recently in one installation for both. There is as yet no general tendency in this direction but there are certain difficulties connected with getting the desired combustion with natural draft which are easily solved by forced draft. Washed gas requires for its successful combustion an intimate mixture of gas and air. This is most usually now done by nozzle burners which require high velocity of air or gas, and, in order to facilitate mixture, the smallest possible proportion in the burner. The result is that where the gas goes into the burner at the slight pressure of the main and the air at atmospheric pressure, the products of combustion will show a pressure considerably below that of the atmosphere, in the bottom of the combustion chamber, resulting in apparent necessity for a higher chimney. A marked drop in pressure through the chimney valve produces the same effect, but this is easily remedied by larger valves. An important requisite in a natural draft

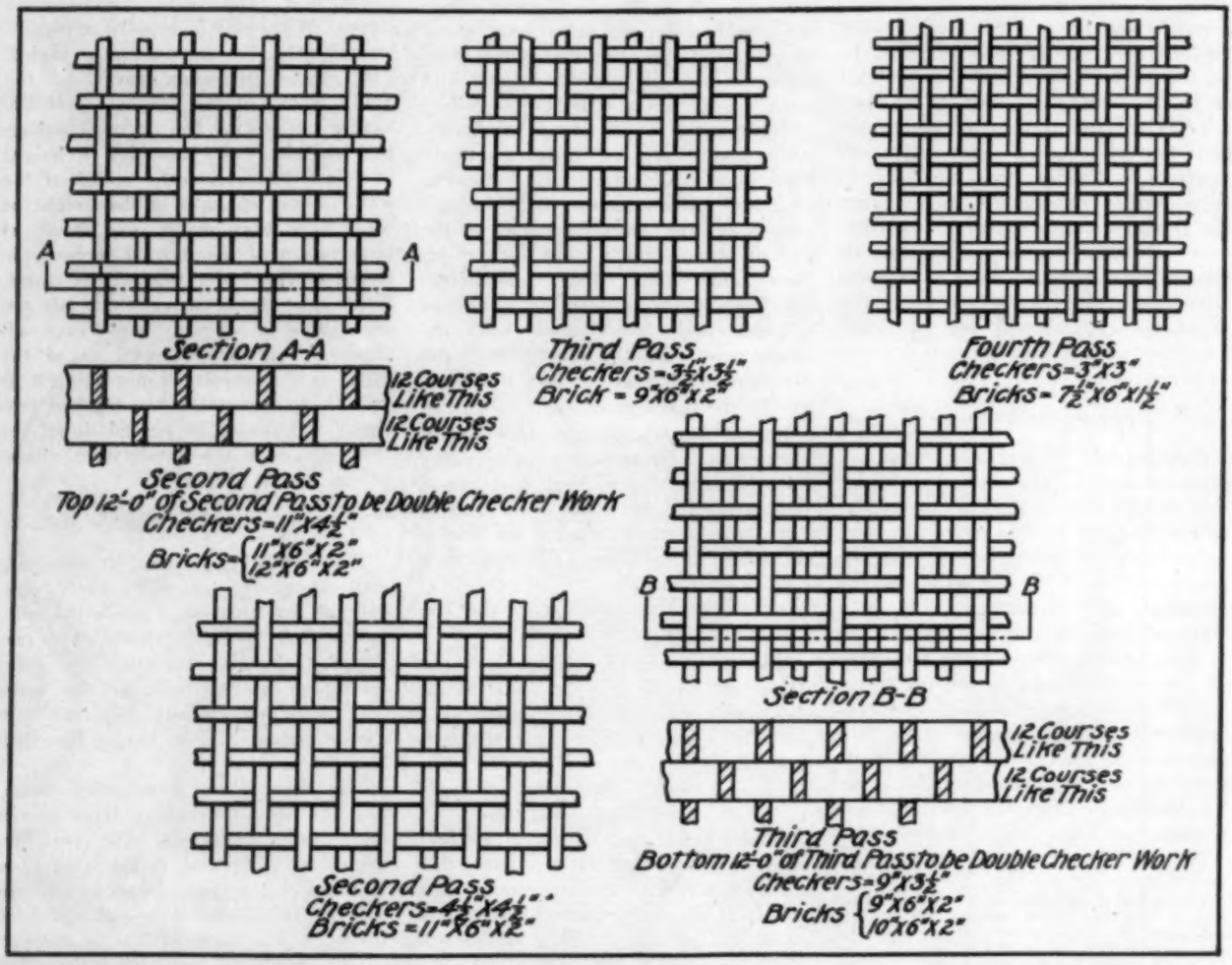


FIG. 5—DETAILS OF CHECKER WORK AND METHOD OF LAYING CHECKERS IN NEW STOVE OF THE ILLINOIS STEEL CO.

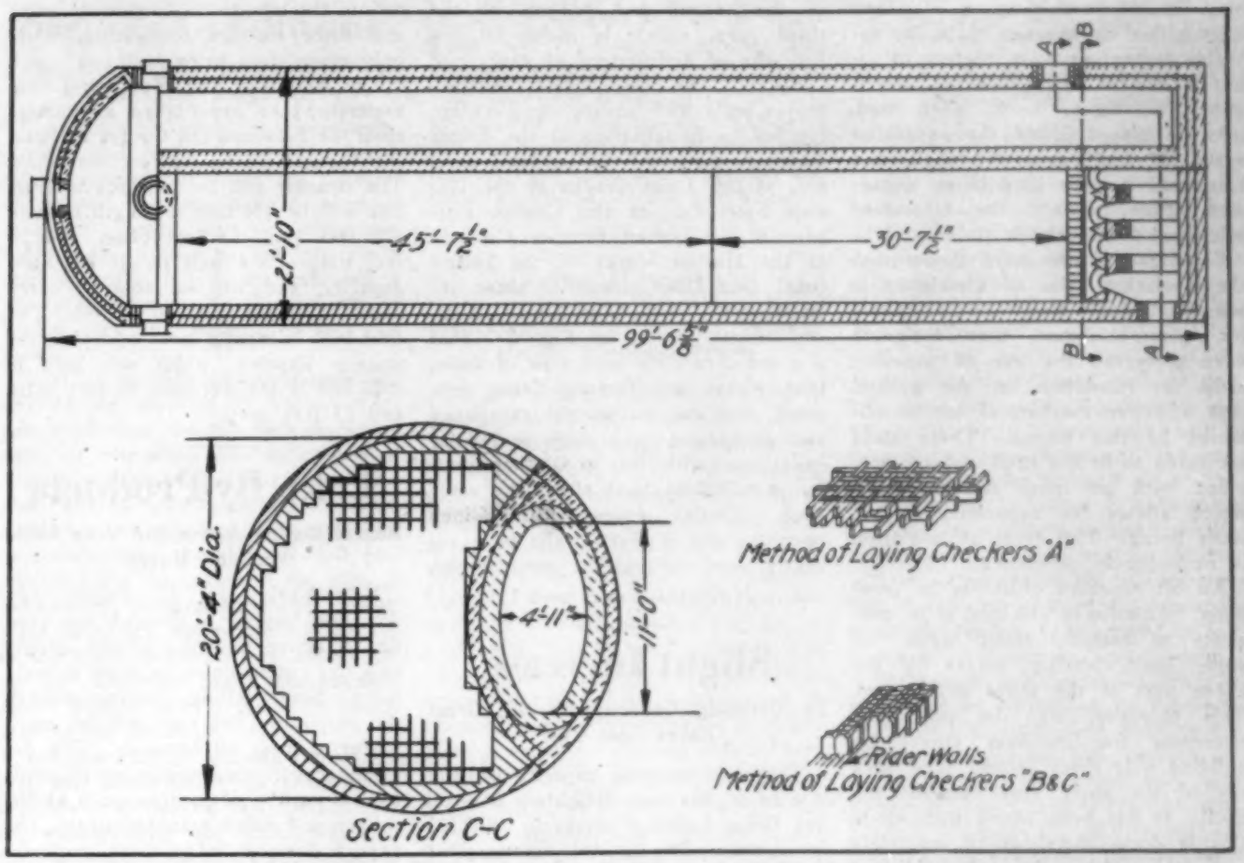


FIG. 6—TWO-PASS SIDE-COMBUSTION STOVE AT THE EDGAR THOMSON WORKS OF THE CARNEGIE STEEL CO.

burner is, therefore, sufficient area for air, and also a sufficiently large opening from the burner into the stove.

For the usual types of stoves the general practice is still to use natural draft. With larger and more economical stoves, the increased friction and lower stack temperatures are requiring higher stacks, which are, however, well within the limits of possible construction. For such stoves, therefore, the chief argument for forced draft is one of better combustion. The design of burners in ordinary use has changed but little since A. N. Diehl's full discussion of the subject before the American Iron and Steel Institute a year ago. The idea of blowing both air and gas into the stove has, however, been reduced to practice since that time at the Joliet works of the Illinois Steel Co. Here an air fan and a gas fan operating on the same shaft and driven by one motor drive air and gas into the burner of the large four-pass stove described hereafter. The extremely large heating surface, 128,000 square feet, and number of passes of this stove made forced combustion a necessity. A consequence of its use, however, has been an extremely accurate proportioning of gas and air, which can be effected continuously without trusting the judgment of the operator. This arrangement also permits accurate regulation of the amount of gas consumed, according to the necessities of the furnace, and a maximum consumption in comparison with ordinary requirements far greater than that obtainable by natural draft. A second installation for use in two-pass stoves is now nearing completion at Canton, O.

Fire Brick Problems

Stove linings are now practically always made of steam-pressed and hard-burned brick with a tendency to specify first quality brick throughout the stove. These brick withstand the highest temperature of stove practice without difficulty. There seems to be no good reason, however, why a second quality brick cannot be used in the lower part of the stove. Such brick are stronger, generally truer to shape and are rather more easily heated than the first quality brick. The chief practical difference, however, is probably the matter of first cost. Experience with these brick has entirely overcome the idea that regenerator brick should be of coarse grind in order more readily to absorb heat. Small checkers require extreme regularity of size and shape which could hardly be furnished by the old methods of manufacture. The matter of expansion under heat is of the utmost importance, but most of the standard brands of brick now in use give little trouble in this respect.

New stoves are now practically always built with an insulating material between the regular fire brick and the shell. This is partially due to the commercial introduction of insulating materials not formerly in common use, but chiefly to a realization that the losses through radiation were generally in excess of 10 per cent of the total quantity of heat furnished to the stoves. The former general practice was to use an average thickness of 2 inches of granulated blast furnace slag between the walls and the shell. This was done chiefly to provide for expansion of the brick, but it also acted as an insulator of considerable value.

The materials now commonly employed are asbestos and kieselguhr in various forms. The asbestos is used either in slabs or as asbestos cement. The kieselguhr is used either powdered, in brick made by cutting and drying the kieselguhr rock, or in brick made from powdered kieselguhr. The powdered kieselguhr has in some cases taken the place of the granulated

slag, in others this space has been filled either by asbestos slabs, by asbestos cement or by a mixture of asbestos cement and powdered kieselguhr. Kieselguhr brick, when used, may be placed inside the expansion space, or built next the shell, and kieselguhr powder used in an expansion space between the kieselguhr brick and the fire brick.

Comparative tests have shown that the insulating value of kieselguhr is somewhat higher than that of asbestos for a given thickness. Some designers have preferred the use of asbestos slabs for insulation on the ground that a better mechanical job is obtained by this means. These slabs are made to fit the shell and are provided with an inner cellular space which allows for expansion of the stove lining. This form of insulation is undoubtedly permanent.

An oft repeated objection to powdered insulation of any kind is its tendency to compact itself inside the stove shell, leaving spaces in the upper part of the stove uninsulated. This objection may be practically overcome for two-pass stoves by building only every second skew back tile of the stove dome against the shell. It has been found that where this is done, shrinkage of insulating material can be made up by additions from the top of the stove. While the kieselguhr brick has a low compressive strength, its light weight makes the strength ample to support a column the height of any ordinary stove. The cost of kieselguhr insulation as applied is less than that of the asbestos. The general use of all of these materials is too recent for any conclusion to be drawn as to the ultimate choice of material.

No reliable data are yet at hand as to the actual reduction in heat loss through the application of insulation to stove construction. There is however no doubt as to the value of insulation when forming part of walls of standard thickness. Very naturally there seems to be no tendency to reduce the thickness of walls on account of the less heat conduction through the insulation.

Variety in the Design of Stoves

Recent developments have brought only one actual construction of what may fairly be called a new type of stove, the new four-pass stove at Joliet. This stove is shown in Figs. 4 and 5. Fig. 4 shows general vertical and horizontal cross-sections through the stove. Fig. 5 shows details of checker work in the three-checker passes together with the peculiar method of laying checkers at the top of the second and bottom of the third pass, which is employed for the sake of distribution of gas.

Recent two-pass side-combustion stoves built with square checkers are typified by installations at the Edgar Thomson works of the Carnegie Steel Co., at the Joliet Works of the Illinois Steel Co., at the Canton Furnace of the United Furnace Co. and at the Harbor works of the Inland Steel Co. The oldest of these installations is that at the Edgar Thomson works shown in Fig. 6. This is a conservatively built type of stove, four stoves per furnace being provided, and the mechanical excellence and permanence have been proved by experience with this and other similar installations built about the same time. Similar stoves with 5½-inch openings and 2½-inch walls have recently been built at the same works.

(*Concluded next week.*)

Slight Increase

In Carrying Capacity on the Great Lakes Last Year

The total carrying capacity on one trip of all the bulk freighters now on the Great Lakes amounts to 3,109,585 gross tons. The figures, just compiled by *The Marine Review,* show that the increase in carrying capacity during 1916 was slight. The gain last year was only 36,266 gross tons, the fleet's capacity on Jan. 1, 1916, having been 3,073,319 gross tons. The greatest total on record was on Jan. 1, 1912, when the bulk-freighter fleet had capacity for carrying 3,135,953 gross tons on one trip. The present capacity is also less than on Jan. 1, 1913.

Seven bulk freighters were built for the lake trade during 1916, their aggregate carrying capacity being 82,000 tons. Offsetting this increase, however, 13 boats were lost or sold to coastwise interests. These boats had an aggregate capacity of 45,734 gross tons.

The total number of bulk freighters now on the Great Lakes, according to figures compiled by the same authority, is less than at any time since Jan. 1, 1906. The bulk freighter fleet now numbers 540, against 546 a year ago. The number of vessels has shown a steady decline since the peak was reached on Jan. 1, 1911, with 592. The decline in the number of vessels has been accompanied by an increase in the capacity of the fleet, a condition resulting, of course, from the increased capacities of the new vessels. The decline from Jan. 1, 1916, to Jan. 1, 1917, of six in the number of vessels, resulted from the loss of 13 vessels to the lake trade, 10 through sales and three through foundering, while only seven were being built.

The American Ship Building Co. is understood to have taken a contract from the Standard Oil Co. for building the biggest oil carrier on the lakes. The steamer will be delivered in 1918. She will be 434 feet in length overall, 420 feet keel, 55 feet beam and 28 feet deep. She will be of 8,000-ton capacity, and will be able to carry about 2,700,000 gallons of oil. The Standard company now operates the steamer RENOWN, which was built in 1912 and is 373 feet keel, 52 feet beam and 25 feet deep.

Coke By-Products

Benzol Buying Active and Very Little Remains Unsold

New York, Jan. 15.—Export and domestic buying of benzol has continued active and the unsold supply now has gotten down to small proportions. Some selling interests believe the output for the year will be insufficient to meet all demands. The domestic contracting continues to come from a variety of sources, such as the rubber and color manufacturers. The export demand is for war purposes and mainly is from companies making phenol for the manufacture of picric acid. Benzol prices, both spot and contract, are from 55 to 60 cents per gallon. Some new demand has been appearing in the toluol market, but supplies are very limited. Some of this demand is of a war character, but a considerable part of it is for peaceful uses. Most of the buying of the latter class is being done from one maker. Prices are quoted at from $1.75 to $2 per gallon on spot and at from $1.50 to $1.75 on contract. A good demand for phenol for forward delivery is current, but offerings are scarce. Some odd lots for early delivery are available at 55 cents per pound and sales are being made by some of the middlemen and producers at 50 cents per pound. Solvent naphtha remains weak and unchanged at from 25 to 30 cents per gallon.

Early demand for sulphate of ammonia is absorbing all supplies, forging further advances in prices. This week quotations are from $4.12 to $4.15 per 100 pounds, at tidewater. The margin between quick shipment and supplies is so small that monthly the producers find they are able to spare only a few cars. There are export inquiries from South America and the West Indies which there is trouble in filling. Additional prices will be found on page 232a.

Serious Conditions

Result From Traffic Congestion—Various Plans Suggested

Youngstown, O., Jan. 15.—Freight embargoes and traffic congestion threaten to interfere seriously with the shipment of finished and semi-finished materials from valley mills. In spite of the partial shut down over the holidays, which was intended to give the railroads a chance to clean up the accumulation of loaded cars, the situation is not improved.

Most of the difficulty experienced has affected the shipment of finished products much more seriously than the movement of raw materials. It is believed that only about 60 per cent of the tonnage offered to the carriers is being handled. The problem of storing steel products at the plants or of still further reducing the output of the mills is threatening manufacturers of sheets, pipe, bars, etc. Companies which have cars of their own are having less trouble making deliveries than the concerns which depend entirely upon the equipment of the carriers.

Raw materials are arriving at furnaces and steel plants with only a semblance of regularity, but as yet, operators in this district have not been obliged to bank any more stacks on account of a shortage of furnace requirements. Much trouble is being experienced in securing prompt delivery of materials such as gannister rock, cord wood, fire brick, ingot molds, tuyeres and furnace accessories. This situation has made it necessary for local companies to send men to the points where these shipments originate, to hurry consignments forward.

One of the remedies for the present traffic embarrassment suggested by a local steel company official involves placing a complete embargo on steel mill products until the present congestion is cleared away. A traffic manager of another Youngstown company suggests that shipments be offered to the roads on only five days of the week, thus giving the carriers two days in which to move accumulated freight. Doubt is expressed as to the effectiveness of either of these plans. Men who oppose the complete embargo say that even if the roads were given a chance to start with a clean slate, it would be but a matter of a few weeks until the present situation would be paralleled. Persons who disagree with the other suggestion claim that it is impracticable. It is generally conceded that in any event, manufacturers must make concessions of some kind in order to help the situation along until the railroads can carry their burden more efficiently.

The Abramsen Engineering Co., Union Bank building, Pittsburgh, has obtained a five-year lease on the Bellefonte Car Works, Bellefonte, Pa., through the estate of John M. Shuget. The Abramsen company, manufacturer of bar straightening machinery, has equipped the machine shop, 60 x 70 feet, and has an option on the foundry building of the car works.

New Process

For Fixation of Nitrogen Without Use of Electrical Power

A new process for the fixation of nitrogen which was described by Prof. John E. Bucher, was one of the interesting features of the ninth annual meeting of the American Institute of Chemical Engineers, which was held at the Chemists' club, New York City, Jan. 10 to 12. The new method, according to the author, enables the recovery of nitrogen from the air by a heating process and without the use of electrical power. Many other interesting papers on applications of chemical science to industrial pursuits were presented. Among others, was a paper on "The Recovery of Benzol from Coke Oven and Illuminating Gas", by C. J. Ramsburg, of the H. Koppers Co., Pittsburgh, and presented by F. W. Speer, chief chemist of that company. Mr. Ramsburg described the present methods in vogue in the iron and steel industry for the recovery of coal tar products by the use of by-product coke ovens . H. G. Miles, president of the Buffalo Foundry & Machine Co., described "Recent Developments in Chemical Engineering Equipment". A paper on the "Corrosion of Ingot Iron Containing Cobalt, Nickel or Copper", was presented by Herbert T. Kalmus and K. B. Blake.

About 100 chemists attended the meeting. Excursions to various industrial plants about New York City were made during the progress of the convention. These included the plants of the Didier March Co., Maurer, N. J., and of the Commercial Acetylene Welding Co., Bound Brook, N. J. A trip to the plant of the American Smelting & Refining Co. at Maurer, N. J., was not made as programmed.

G. W. Thompson, chief chemist of the National Lead Co., was elected president of the institute for the ensuing year. Henry Howard, of the Merrimac Chemical Co., Boston, was newly chosen as third vice president and Dr. J. C. Olsen, of New York, was re-elected secretary. It was decided to hold the summer meeting in Buffalo.

Malleable Plant

Will Be Thoroughly Modern—Will Have Electric Furnaces

The new Cleveland plant of the National Malleable Castings Co., previously noticed in these columns, is to be located on the northern end of a property already owned by the company, lying along the Belt Line railroad between Quincy and Woodland avenues, and bounded on the east by Woodhill road.

The buildings will all be of the most modern fire-proof type of construction. The works departments will all be under a single roof with a central heating system and the construction adopted is such as will afford the best possible conditions of lighting and ventilation. Every facility known in the best present-day practice will be provided for the safety, comfort and convenience of the employes, including lockers, showers, first aid and medical facilities.

The conditions under which the work will be carried on in the foundry, apart from adequate lighting and ventilation, will be still further improved by the use of electricity as a source of heat for refining the iron. Electric furnaces of the heroult arc type will be employed, in connection with a special process worked out by the company under patents controlled by it, and in successful operation at one of its other malleable plants. The use of electricity will minimize both dirt and smoke. Every department in the shop will be covered with and served by overhead electric traveling cranes. In the annealing department, the furnaces will be equipped to eliminate the smoke nuisance. The equipment to be used has been given thorough trial and is in successful operation in other plants of the company.

The entire equipment of the plant will be arranged upon the unit basis, which will very readily permit of expansion. The use of the old plant will be discontinued as soon as the new one is ready for occupancy and the old property will be sold.

The Sistersville Boiler Works, Sistersville, W. Va., has awarded contracts for the erection of a fabricating tank and boiler shop to the Bellefontaine Bridge & Steel Co., Bellefontaine, O.

The second unit of the new Waldorf Hotel of Toledo, is to be erected soon. The general contract has been given to the H. J. Spieker Co., of Toledo, and about 1,000 tons of steel will go into its construction.

Iron and Money: Fact and Comment

Is it Wise to Inventory Material Stocks at Going Market Prices?—President Piez of Link-Belt Co. Answers This Question

IT DOESN'T pay to send out an order for a pearl necklace because you are surrounded with blue chips in the middle of the game. Wait, for you may be owing the bank before the game is over.

In this way, Charles Piez, president of the Link-Belt Co., Chicago, answers the question, "How am I going to inventory my raw material", which has confronted many manufacturers at the year-end.

The manufacturer may have on hand, or contracted for, a considerable tonnage of raw materials at prices considerably below the market. He may be sorely tempted to include in his year's profits the appreciation in values resulting from his foresight. This would be only in line with the usual policy of inventoring raw products at the market price and would not be opposed to customary accounting methods. But conditions this year are not usual, and usual or customary methods may not, therefore, be safely applicable to them. The advances in prices of such raw materials as pig iron, steel and copper have proceeded with scarcely a break for 18 months. It is a poor buyer indeed who, in such a market, could not show considerable profit on his purchases. The trend is still upward in spite of the extraordinary advances in steel and pig iron the past 90 days. Stocks of these materials look like ready money to the fortunate possessor, no matter what price he paid for them. Why does he not inventory them at the existing market price and take his profit?

"The spectacular drop in the prices of securities during the past ten days supplies the answer," says Mr. Piez. "The rise in raw materials prices has been as substantial as the rise in price of the war brides and the decline is likely to be as severe, though not as spectacular. Even if this drop be not imminent, even if the present exceptional price level is maintained for another year, the manufacturer ultimately will be faced with the reverse of the present problem—a stock of raw materials contracted for at high prices, in a rapidly declining market. And his net profits growing out of his material purchases during the entire period of inflation and resurgence to the normal level will be the difference between his profits from the rise and the losses sustained from the drop.

"At present, he is only half through this period. He can show his profits from the rise; his losses are still matters of the future and he has supreme judgment in his foresight. But the conservative manufacturer will consider that, as he has but half completed the transaction, he had better not consider the increase in the values of his raw material as a profit. He will consider that he is temporarily custodian of a goodly sum, a part of which may remain with him if his judgment is sound and luck stays with him. But he will decide that he had better set aside a certain amount as reserve against the drop that is inevitable. Conservatism—and that is the quality to apply to methods of figuring profits this year—will dictate that, if pig iron and steel be inventoried at the present market prices, a reserve of at least $10 a ton on the pig iron stock and a reserve of at least $20 a ton on the steel stocks be set aside before profits are figured."

Companies Merged

The Clark Equipment Co., Buchanan, Mich., announces that on Jan. 1 the business of the Celfor Tool Co. and that of the Buchanan Electric Steel Co. were taken over by the Clark Equipment Co., a new corporation organized for that purpose. The merger is solely for the purpose of strengthening both companies. There will be no change in either the manufacturing or selling methods and the personnel of the organization will be the same.

Stocks Ignore Entente Reply

Active buying of securities might have been expected to follow the reply of the entente powers to President Wilson, for it indicated indefinite prolongation of the war. But the stock market almost ignored this development. Trading dwindled to the lowest volume in months and prices have moved uncertainly.

In the iron and steel division of the stock market, the line is being drawn more and more sharply between the stocks of companies who are producers of their own raw materials and those who are forced to buy such materials. Quotations on a number of iron, steel and industrial shares at the close of the New York stock exchange Jan. 13 and net changes for the preceding week follow:

	Close Jan. 13.	Net chg.
American Can	44⅝	—3⅛
American Can, prfd.	109	—1
Amer. Car & Fdy.	65	—2
Amer. Car & Fdy., prfd.	118	+1¼
American Locomotive	75½	—1⅛
American Locomotive, prfd.	106	+ ⅜
American Steel Foundries	60⅛	+ ⅛
Baldwin Locomotive	54⅞	—2⅜
Baldwin Locomotive, prfd.	102	.....
Bethlehem Steel	470	—25
Colorado Fuel & Iron	45¼	— ¼
Continental Can	89¾	+ ¼
Crucible Steel	62¼	—1½
Crucible Steel, prfd.	114⅜	— ⅛
General Electric	168	+1
Gulf States Steel	126	—4
Gulf States Steel, 1st prfd.	105¼	—1⅞
International Harv. of N. J.	119½	—1½
Internat'l Harv. of N. J., pr.	118	—2¾
Internat'l Harv. Corp.	83½	.....
Inter. Harv. Corp., pr.	114¾	.....
Lackawanna Steel	83¼	—1⅜
Pressed Steel Car	76	+ ½
Pressed Steel Car, prfd.	103	—¼
Pullman Palace Car	166	+3¼
Republic Iron & Steel	77¾	—2
Republic Iron & Steel, prfd.	104½	+1
United States Steel	110½	—2
United States Steel, prfd.	120	.....
Westinghouse Mfg.	52¾	—1½

Maximum quotations for a number of steel and industrial stocks, not listed on the New York stock exchange, at the close Jan. 12 and Jan. 5, follow:

	Jan. 12.	Jan. 5.
American Radiator	410	...
American Ship Building	65¼	67⅝
Cambria Steel	...	125
Chicago Pneumatic Tool	71	72½
LaBelle Iron Works	81	82¾
Lake Superior Corp'n	20⅛	21½
Stewart-Warner Speed. Co.	100	101
Warwick Iron & Steel Co.	9½	9¾
Westinghouse Air Brake	157	157½
Westingh'se Elec. & Mfg. Co.	54	55

Will Mine Iron Ore in Missouri

The Butler Iron Co. has been incorporated under the laws of Illinois with a nominal capital of $2,000,000 to conduct mining operations in Butler county, Mo., where the company owns 10,000 acres of iron ore land. The company will build a blast furnace, concentrating plant and a chemical plant at Poplar Bluff, Mo., to cost about $680,000. Officers are: President, W. W. Mechling, formerly with the Carnegie Steel Co. and the Ford Steel Wheel Co.; vice president, M. H. Cutter, of the municipal bond house of M. H. Cutter & Co., Chicago; treasurer, H. F. Landeck, president of the City National Bank of Oshkosh, Wis.; secretary, J. A. Massen, of the law firm of Hollen & Mas-

sen, Chicago. Directors include the foregoing and C. H. Wheeler, Gary, Ind.; W. E. Orthwein, St. Louis banker; E. P. Sedgwick, treasurer of the Chicago Hardware Foundry Co., North Chicago, Ill.; Charles E. Temple, attorney, of Grand Rapids, Mich.; and B. F. Baker, treasurer of the Kewanee Boiler Co., Kewanee, Ill. The general offices of the company are at Poplar Bluff.

To Make Sheet Metal Goods

The Canton Metal Products Co., Canton, O., has been incorporated with a capital stock of $1,000,000 to manufacture sheet metal goods, such as roofing, siding, shingles, eave troughs, conductor pipe, etc., as well as a complete line of metal building materials and reinforcing plates. The company takes over the established business of the Canton Corrugating Co. Modern fireproof buildings will be erected, work to start as soon as weather permits, upon a plant which will cover six and a half acres and which will employ 500 men. Officers of the company are experienced sheet metal manufacturers, most of them having been connected with the Berger Mfg. Co., Canton. They are: President, Harry G. Bow, former sales manager of the Berger company; vice president, R. L. Kreighbaum, former advertising manager for the Berger company; treasurer, H. L. McKenzie, formerly manager of the jobbing department of the Berger company and later manager of the Canton Corrugating Co.; secretary, J. S. Immler. At present the company is operating the plant of the Canton Corrugating Co., whose business it purchased.

New Foundry

A new foundry has just been completed and placed in operation by the Valley Star Stove Co., Wheeling, W. Va. The foundry is housed in a steel building which has three times the floor space of the old foundry. All modern equipment has been installed and the company is now taking orders for immediate delivery.

Negotiating for Large Acreage

New York, Jan. 15.—Official confirmation is lacking of the report that the Midvale Steel & Ordnance Co. has concluded the purchase of 16,000 acres of gas and coking coal land in Westmoreland and Washington counties, Pennsylvania, comprising the properties of the Pittsburgh-Westmoreland Coal Co. The reported consideration is $9,000,000. It is understood that the negotiations for the purchase of this property still are going forward and have not been consummated.

Westinghouse Merger

Plans for the merger of the Union Switch & Signal Co., Swissvale, into the Westinghouse Air Brake Co., Wilmerding, Pa., were declared effective Jan. 12, at a special meeting of the board of directors of the Air Brake company. Virtually all the stock of the Union Switch & Signal Co. has been deposited in assent to the plan. A meeting of the Switch & Signal

A. L. HUMPHREY,
President, Union Switch & Signal Co.

company directors was held to give Air Brake officials representation on the board.

W. D. Uptegraff, president of the Switch company, resigned to become chairman of the board and A. L. Humphrey, general manager of the Air Brake company, was elected president; T. W. Siemon, vice president and treasurer; George A. Blackmore, vice president in charge of sales; T. S. Grubbs, acting vice president and secretary; Charles A. Rowan, comptroller, and F. V. Shannon, auditor. The directors of the Air Brake company have called a special meeting of stockholders for March 15 to ratify the merger and to approve an increase in the capital of the company from $20,000,000 to $30,000,000 to finance the transaction. Out of the increased capital it is proposed to declare a stock dividend of 20 per cent to holders of Air Brake stock.

Financial Crop Ends

The Bishop-Babcock-Becker Co., Cleveland, has adopted a financing plan by which old stock is exchangeable on the basis of 90 for the preferred and 5 for the common. The new stock is to be $50 par.

* * *

The affairs of the defunct Universal Mfg. Co., Racine, Wis., manufacturer of automobile steering gears and accessories, which failed Dec. 14, 1914, have been closed by the declaration of a dividend of 6.1 per cent on approved claims amounting to $85,973.

* * *

Stockholders of the Wagner Electric Mfg. Co., St. Louis, have approved the proposal to increase the company's stock from $2,000,000 to $5,000,000. W. A. Layman was re-elected president, and James W. Bell, secretary. Directors are: Mr. Bell Mr. Layman, W. K. Bixby, Albert Blair, J. M. Buick, John F. Lee and Thomas H. West.

* * *

When stockholders of the Youngstown Sheet & Tube Co. hold their annual meeting Feb. 13, common stockholders will be apprised of the working of the federal income tax and its relation to a plan to increase the common stock from $20,000,000 to $40,000,000. Stockholders then will decide in what manner dividends earned on the $20,000,000 issue are to be distributed.

* * *

A $1,000,000 consolidation of ship building concerns has been formed at Mobile, Ala., which will be known as the Alabama Dry Dock & Ship Building Co. The companies comprising the new merger are the Ollinger & Bruce Dry Dock Co., the Gulf Dry Dock Co. and the Alabama Iron Works. It is understood that the ship building capacity at Mobile will be considerably increased.

* * *

The Ladish-Obenberger Co., Cudahy, Milwaukee county, Wis., formerly the Obenberger Drop Forge Co., has changed its corporate style to the Ladish Drop Forge Co. The interest of John Obenberger was taken over early in 1916 by Frank Ladish and associates. Mr. Obenberger later organized the John Obenberger Forge Co., West Allis, Milwaukee county, with a capital stock of $160,000.

* * *

The Rice, Barton & Fales Machine & Iron Co., Worcester, Mass., has issued $200,000 worth of first mortgage 6 per cent serial gold bonds in denominations of $1,000 each, dated Jan. 2, 1917, and due $20,000 annually from Jan. 2, 1919, to Jan. 2, 1928. The funds provided will be used as working capital for expansion in the company's business. The company has a surplus of $471,000, but it prefers to raise the money by a bond issue and pay it back at the rate of $20,000 annually for 10 years than to use any part of the surplus. The net earnings last year were $100,000.

News of Employers and Employes

Vocational Education Bill Explained by Congressman Hughes—A Highly Important Measure Which Will Probably be Sent to President Wilson in a Few Days

WASHINGTON, Jan. 16. — Designed to increase the efficiency of the wage earner, whether on the farm or in the industries, by insuring an intelligent direction and application of energy in production, a vocational education law is about to be written into the statutes of the country. "America first and America efficient" will thus be given considerable impetus. The legislation was urged by the administration, and passed the senate at the first session of the present congress, while it passed the house last week. Although the house in taking up the bill, through the guidance of Representative Dudley M. Hughes, of Georgia, chairman of the committee on education, struck out everything in the senate measure after the enacting clause, there are only two amendments of any importance which were made by the lower branch of congress to distinguish its bill from that of the senate. It is probable that when the bill goes to conference, no difficulty will be experienced in reaching a final and satisfactory conclusion on the measure. The conferees have already been chosen and the bill may be in the hands of the President before the end of the present week.

Not only is the legislation of a nonpartisan character, but it grew out of an overwhelming public sentiment which showed the need for vocational education in the United States. This sentiment came from every class of citizenship, from the educator, the manufacturer, the trade unionist, the business man, the social worker, and the philanthropist. Every state superintendent of public instruction has declared that its rapid extension was required for many different reasons in his state and great national educational, civic, industrial and commercial organization, representing more than 12,000,000 people, have repeatedly gone on record as believing that a system of vocational education was absolutely necessary to the future welfare of the nation.

The purposes of the legislation are to be executed through co-operation between the federal government and the respective states. For every dollar paid out of the national treasury to the states, the states are to apply a like amount for training in vocational pursuits. Vocational education as defined in the legislation under discussion refers to that kind of practical education which is intended to prepare girls and boys for useful employment or occupation. It is especially designed to prepare workers for the more common occupations in which the great mass of the people find useful employment. It means that form of education whose controling purpose is to give training of a secondary grade to persons over 14 years of age for increased efficiency in the trades and industries, in agriculture, in commerce, and commercial pursuits, and the house bill includes home economics.

For 1917-18, the bill appropriates $500,000 for training in agriculture; $500,000 for training in trades and industries; $500,000 for the preparation of teachers for giving such training, and $200,000 for administration purposes at the hands of a federal board of vocational education, which is to co-operate with the states. These appropriations are to continue until 1925-26, when there will be annual appropriations of $3,000,000 each for teachers of agriculture and of industry; $1,000,000 for the training of such teachers, and $200,000 for the apportionment of the administration board. The states are to furnish the schoolhouses and everything else for the maintenance of the schools.

Teaching is to be done under the direction of the boards of education of the states, approved by the general board. The senate bill provides that the federal board shall be ex-officio, consisting of the postmaster general, the secretary of the interior, the secretary of agriculture, the secretary of commerce, and the secretary of labor, with the commissioner of education as its executive officer. The house measure is held to be more representative because it proposes a board to be selected by the President, the board to name its own chairman, and to consist of four members, together with the commissioner of education. One of the members would be a representative of manufacturing interests; one of commercial interests, other than manufacturing; one of labor and one of agriculture. The chairman would be elected annually, two members would be elected for two years and two for four years, and subsequently the members would be appointed for a term of four years. The plan of organization of the board represents one of the two more important differences between the senate and house bills. The other principal difference is the inclusion by the house and omission by the senate of the element of home economics training. The legislation followed a report made to the sixty-third congress at its second session by the commission on national aid to vocational education, which was created by an act of Jan. 20, 1914, the commission being selected by the President. This commission consisted of Hoke Smith, of Georgia, chairman of the senate committee on education and also of the commission; Senator Carroll S. Page, of Vermont; Representative Hughes, Representative S. D. Fess, of Ohio; John A. Lapp, Indianapolis, director of the Indiana bureau of legislative information and also secretary of the Indiana commission on industrial education, 1912; Miss Florence M. Marshall, New York City, director Manhattan trade school; Miss Agnes Nestor, Chicago, president International Glove Workers' Union, and member of the committee on industrial education, American Federation of Labor; Charles A. Prosser, New York City, secretary National Society for Promotion of Industrial Education, and Charles H. Winslow, Washington, D. C., special agent bureau of labor statistics, department of labor.

The commission conducted extensive hearings and submitted a unanimous report to congress and made recommendations which are reflected in the vocational education legislation about to be enacted into law.

"There are only nine states at present which give training in vocational education," said Mr. Hughes, to *The Iron Trade Review* correspondent, "but they do not do it to the extent that reaps such results as are contemplated in the bill. The measure classified the schools as to states in order to protect the autonomy of commonwealths, which is not affected in any way. The education given in the schools should be less than that provided in the college grade. The schools are meant to prepare boys and girls over 14 years of age for useful or profitable employment in agriculture, trades and industries, and there are three types of schools provided by the bill. First, there is the all-day school, in which practically one-half of the time should be given to actual practice on a useful or productive basis; second, comes the part time school for workers over 14 years of age, so that they can either extend their vocational knowledge or prepare for entrance to a vocation; also this school can extend the general civic or vocational intelligence

of the people; finally, there comes the evening school for workers over 16 years of age.

"The need of such education is suggested by the census of 1910. According to this census there were 12,659,203 persons in the United States, both male and female, engaged in agriculture. While it is impossible to secure accurate figures, it is probable that less than 1 per cent of these have had adequate preparation for farming. This means there are over 12,000,000 people engaged in agriculture in this country who are not trained to deal with the soil in such a way as to make it produce, through scientific methods, what it should yield in order to sustain the present and future life of this nation.

"Engaged in manufacturing and mechanical pursuits and allied industries there were 14,261,376. It is equally correct to say that not one out of every 100 of these workers has had, or is having at the present time, any adequate chance to secure training.

"The American people have hardly begun the work of providing for the practical education of these millions of our wage workers. In this whole country, there are fewer trade schools than are to be found in the little German kingdom of Bavaria, with a population not much greater than that of New York City. There are more workers being trained at public expense in the city of Munich alone than in all the larger cities of the United States, representing a population of more than 12,000,000. It is substantially true that practically every German citizen who could profit by it may receive vocational training for his life work in the schools and classes supported out of the public treasury.

"The problem of production in the future must look less and less to the natural resources, which are limited, and must look more and more to the scientific possibilities, which are unlimited. In agriculture, our acreage is not to be greatly increased, but our demands will continue to grow. The limitation of production and a constant increase of the demands of consumption present the real problem. We must secure this skilled training, first to avoid waste in our resources, and, second, to find the new laws of production.

"This education is designed to reach at least three sources of waste—

"(1) The involuntary idle;

"(2) The imperfectly employed; and

"(3) The improperly employed.

"When placed upon the basis of an investment, vocational training is a sane business proposition. We have 25,000,000 persons over 18 years of age at work. If vocational training would augment the income by 10 cents a day, there would be an increase of wealth in the hands of the workers of $2,500,000 per day, or three-fourths of a billion dollars per year.

"Only half of the children who enter the city elementary schools of the country remain to the final elementary grade, and only one in 10 reaches the final year of high school. On the average, 10 per cent of the children have left school at 13 years of age; 40 per cent have left by the time they are 14; 70 per cent by the time they are 15; and 85 per cent by the time they are 16 years of age. On the average the schools carry their pupils as far as the fifth grade, but in some cities great numbers leave below that grade.

"If we assume that all children should have a minimum school training equivalent to the eight grades of the elementary school, we must acknowledge that the schools now furnish this minimum to less than half the children who enter them. The rest leave school with inadequate general education and with no special training to fit them for work.

"The age at which a boy or girl is likely to drop out of school is the adolescent—just the period when he ought not be allowed to drift because of the inevitable fruits of idleness. At this period, the youth is trying to find himself. If he is to become a wage earner, the nation ought to make it possible for him to easily find his field. It should be his choice rather than his lot. A system of continuation schools ought to be provided, so that when the boy takes up some work, it does not mean his education must stop. It ought to be so provided that his work is but the application of his schooling. This is made possible by the part time and evening schools, both of which are made feasible by this bill. Under this scheme a boy at work does not mean a boy out of school.

"The bill is written upon the theory that the aim of utility in education is not inconsistent with the dignity and culture of training. This proposed legislation rests upon the principle that any piece of work that reflects thoughtfulness in the worker shows in that degree at least the element of culture.

"It is sought in this legislation to lessen the sources of social unrest among the masses, by not only giving a dignity to labor, but the opportunity of creative work and a fairly full expression of the worker's ability. In this way, a higher standard of living among the workers is a legitimate result to be anticipated."

The Blackburn-Smith Corporation, 105 West Fortieth street, New York, through purchase of the filter department of James Beggs & Co., has acquired all patents, records, patterns and rights for the manufacture and sale of the Blackburn-Smith feed water filter and grease extractor and the Blackburn-Smith sewage ejector system.

Hurley's New Plant

Chicago, Jan. 16.—Edward N. Hurley, who resigned the chairmanship of the federal trade commission last week, announces that one of his first acts after he becomes settled into business again will be to start work on a model factory for the Hurley Mfg. Co. He has obtained the services of W. F. McGuire, an engineer, who assisted largely in planning the Ford plant at Detroit. The cost of the new factory will be about $400,000.

On being asked if his resignation from the trade commission was for the purpose of being appointed to a higher government commission, he denied that any such idea was true and said that he intended to devote his time entirely to his business. He says that his resignation was delayed beyond the time when he desired to sever his connection and if he had done as he desired last fall, his new factory would have been well under way by this time.

German Steel Production

Washington, Jan. 16.—Based upon a report of the German Iron and Steel Society, American Consul General H. W. Harris, stationed at Frankfort-on-the-Main, has sent figures to the department of commerce showing that Germany has substantially increased the output of its steel mills during the first 10 months of 1916. The production for that period, January to October inclusive, the output was 13,354,418 tons, as compared with 10,892,378 tons for the corresponding period of the immediately preceding year. For the 26 work days in October, 1916, a record was established, the production having been 1,423,535 tons, comparing 1,396,186 tons for the same number of work days in September. The daily production averaged 54,751 tons in October, and 53,584 tons in September, the average daily production for October, 1915, was 46,741 tons, and for October, 1914, it was only 33,341 tons.

High Cost of Bridges

Bids have been opened for the construction of a lift bridge over Chicago river at Twelfth street and it was found that under present circumstances the cost will be almost double the bond issue provided for this purpose. Bids ranged from $1,123,000 to $1,173,000, while the bond issue provides only $650,000. The excess in cost is due to the high price of steel.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

JOHN O. PEW, president and general manager of the Youngstown Iron & Steel Co., Youngstown, O., has tendered his resignation to the company's directors effective Feb. 15. For more than a year, Mr. Pew had desired to retire from active duties and take a rest, but has continued in the service of the company on account of important improvements that were being made. Mr. Pew first took up the metal roofing business in Niles more than 20 years ago, when with L. E. Cochran, Mason Evans, H. W. Heedy and G. M. McKelvey, he organized the Youngstown Iron & Steel Roofing Co., the concern erecting a plant in the eastern part of Youngstown. Sheets were purchased then principally from the mill of the Andrews Bros. Co., nearby.

When the Andrews Bros. Co. works was taken over by the Republic Iron & Steel Co., L. E. Cochran, H. W. Heedy, John O. Pew, Mason Evans and G. M. McKelvey erected the steel sheet plant of the company at Haselton. Three years ago the company constructed a steel works at Lowellville. Four years ago when Mr. Cochran died, Mr. Pew, then general manager, assumed the presidency also.

Frederick H. Schmidt, a director of the company, formerly contracting engineer of the Youngstown Bridge Co., but for some time past a resident of New York, has been suggested as Mr. Pew's probable successor, but no official announcement has been made.

Andrew Bryson has resigned as president of the Brylgon Steel Casting Co., New Castle, Del., and has severed his connection with that company.

M. H. Maury has been appointed manager of furnaces and ore mines of the Virginia Iron, Coal & Coke Co., with office at Roanoke, Va.

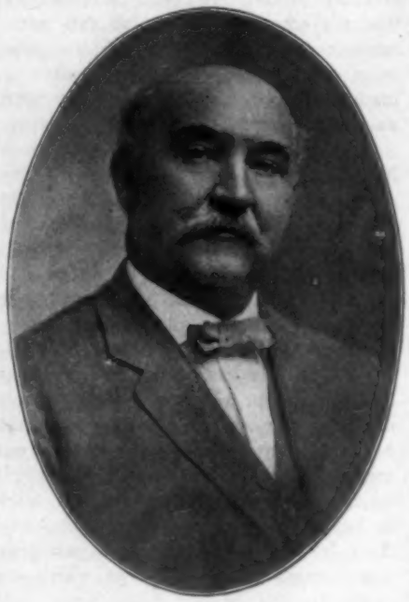
H. M. Zuck has been made traffic manager of the Lukens Iron & Steel Co., Coatesville, Pa. He formerly was in charge of the shipping department.

C. E. Middleton has resigned as general manager of the Carbon Steel Co., Pittsburgh, to become vice president of the Penn Seaboard Steel Corporation.

A. A. Frazee, for several years identified with the Pittsburgh office of Shimer & Co., Inc., Philadelphia, now is connected with the Reliance Iron & Coke Co., Cincinnati, with offices in the Frick Annex building, Pittsburgh.

Louis J. Hinde, vice president of the Toledo Machine & Tool Co., Toledo, O., was recently elected a member of the board of directors of the Merchants' and Clerks' Savings Bank.

H. H. Pleasance has been appointed assistant general manager of sales of the United Alloy Steel Corporation,



JOHN O. PEW,
Who has Resigned as President of the Youngstown Iron & Steel Co.

Canton, O. Mr. Pleasance's headquarters will be in Canton and Cleveland.

F. B. Longanecker, who recently resigned from the Enterprise Mfg. Co., Columbiana, O., now is connected with the Vanadium Alloys Steel Co., Pittsburgh.

L. E. Nutt, secretary and director of the Velie Motors Corporation, Moline, Ill., for a number of years, has resigned. The corporation has sent out a letter highly complimentary to Mr. Nutt.

Chas. M. Biddle Jr. and Marshall S. Morgan have been elected directors of the Supplee-Biddle Hardware Co., Philadelphia. F. I. Hall has been made vice president of the same company.

H. Denton White has been elected president of the Laconia Car Co., Laconia, N. H., to succeed C. S. Hawley. John E. Johnson has been made vice president in charge of the works.

Charles H. Newcomb, manager of the Philadelphia office of Crocker Bros., has been seriously ill with an attack of pneumonia, but now is recovering.

George E. Fogarty, personal representative of the Fitchburg Machine Works, Fitchburg, Mass., has returned from a five years' absence in Italy. He will return there after an extended sojourn in the United States.

Geo. W. Knopf, who recently resigned as assistant manager of the Pottstown, Pa., plant of the McClintic-Marshall Co., has opened an office in the Pennsylvania building, Philadelphia, as a consulting engineer.

Donald Tulloch, secretary of the Worcester, Mass., branch of the National Metal Trades Association, has declined an offer to accept a similar position with a branch in a large city in New York state.

Arthur W. Robinson, formerly truck sales manager and director of the Locomobile Co. of America, Bridgeport, Conn., has been promoted from director to the position of managing director of Gaston, Williams & Wigmore, Ltd., London, Eng.

C. G. Tarkington is in charge of a branch office at 2418 Farmers Bank building, Pittsburgh, opened by the Haynes Stellite Co., Kokomo, Ind. Mr. Tarkington formerly was connected with the Snyder Electric Furnace Co., Chicago, Ill.

George W. Bender has been appointed assistant to the vice president of Mudge & Co., Chicago, manufacturers of railway specialties. Mr. Bender was formerly in charge of the mechanical department of the Mudge company.

Chas. T. Bird, connected with the Pangborn Corporation, Hagerstown, Md., some years ago as sales engineer and for the past year with the Mott Sand Blast Co., resigned Jan. 1, to become associated again with the Pangborn Corporation, as vice president and works manager, in charge of engineering and production.

E. F. Kenney, metallurgical engineer of the Cambria Steel Co., has been appointed metallurgical engineer of the Midvale Steel Co., Worth Bros. Co. and the Wilmington Steel Co.,

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

effective Jan. 1. Mr. Kenney will remove his office from Johnstown, Pa., to the Widener building, Philadelphia.

Henry R. Power, instructor in chemistry at Worcester Polytechnic Institute, Worcester, Mass., for the past 5½ years, has resigned to become director of the general laboratory of the Carborundum Co., Niaraga Falls. He is a member of the American Chemical society and the American Society for Testing Materials.

Frank W. Skinner, consulting engineer at New York, presented a paper on the "Construction and Erection of the New Quebec Bridge" before the Brooklyn Engineers' Club at the Brooklyn Engineers' Club House, 117 Remsen street, Thursday evening, Jan. 11. The paper was illustrated by various slides.

H. W. Burson, who organized the Colonial Supply Co., Pittsburgh, recently sold his interest in that concern and now is head of the Burson Supply Co., with offices in the Arrott building. Mr. Burson has been identified with the mine and mill supply trade for about 15 years.

Horace R. Thayer, assistant professor of structural design, Carnegie Institute of Technology, read a paper on "Historic Failures of Masonry Structures", Jan. 9, before the structural section of the Engineers' Society of Western Pennsylvania. The meeting was held in the society rooms in the Oliver building, Pittsburgh.

George L. Pollock has resigned as purchasing agent of the Chicago & Western Indiana and the Belt Railway of Chicago, to become vice president of the Burnside Steel Co., with headquarters in Chicago. Mr. Pollock has been associated with railroads since 1892, and has held the position of purchasing agent for the above named railroads since May, 1910.

L. A. Zurcher, engineer for Germano Boettcher, a Brazilian house, which is an agent for the American Steel Export Co., New York, has arrived in New York for a conference in regard to the possibilities for greater activities in Brazil after the war. He expresses the belief that manufacturing in Brazil is just beginning to develop and that the opportunities for American products are very great.

Ernst Twitchell, Ph. D., will be presented a Perkin medal for notable achievements in chemistry at a meeting of the New York section of the Society of Chemical Industry at Rumford Hall, 50 East Forty-first street, Friday evening, Jan. 19. The presentation will be made by Chas. F. Chandler, senior American past president of the Society of Chemical Industry and Mr. Twitchell will make acknowledgment.

George L. Collard, general manager of blast furnaces at Sharpsville, Pa., of the Shenango Furnace Co., Pittsburgh, has been appointed president of the chamber of commerce of Sharon, Pa. He has taken an active interest in civic and social work at Sharon for several years. Mr. Collard succeeds Severn P. Ker, president of the Sharon Steel Hoop Co., Sharon, Pa., as head of the chamber of commerce.

William Wieman, who recently resigned as secretary and treasurer of Banning, Cooper & Co., Ltd., the Oliver building, Pittsburgh, has opened offices at 815 Frick building, that city, and will handle pig iron, coke and steel products. Mr. Wieman had been identified with the Banning-Cooper organization since 1909. For six years previously, he was Cleveland and Pittsburgh representative of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.

Frank L. Driver, president of the Driver-Harris Wire Co., of Harrison, N. J., has sailed for Manchester, Eng., where his concern will open a branch there to be known as the Driver-Drennan-Cooper Co. Mr. Driver went to England some time ago to make a study of the wire industry in that country. Heretofore finished material has been shipped to England from the Harrison plant. The new plant was erected to prevent delays caused by the war.

New Year's promotions in the staff of the Locomobile Co. of America, Bridgeport, Conn., were: Edwin A. Travis, assistant sales manager to general sales manager; Delmar G. Roos, from the engineering department to assistant chief engineer; Percy W. Hine, of the sales department, as manager of the Bridgeport branch and the Bridgeport territory, including its service department; Clinton B. Armorous, assistant purchasing agent to the general sales department; Thomas E. Swayne, Oakland, Cal., transferred to the Los Angeles branch as manager; J. Murray Page, Los Angeles, Cal., transferred to Chicago as manager.

Col. H. A. Marting has retired as general manager of the Marting Iron & Steel Co., Ironton, O. Because of ill health he has turned over his active duties to E. O. Marting, vice president. Colonel Marting remains as chairman of the board and president of the company; E. O. Marting combines the vice presidency with his new duties; W. W. Marting is secretary; the directors are A. C. Lowry, A. H. Mittendorf, F. L. McCauley, John A. Green, F. L. Marting and D. C. Davies. The company, which operates three blast furnaces, has had an unusually prosperous year; orders on its books insure another busy twelve-month.

Charles H. Hutchins, president, and his brother, George F. Hutchins, general superintendent of the Crompton & Knowles Loom works, Worcester, Mass., will retire from these offices at the annual meeting of the corporation on Feb. 28. Both have held them for 20 years, since the consolidation of the two interests and are retiring from active business life because of their advanced ages, the former having reached his seventieth birthday Jan. 13, while his brother is four years his senior. Lucius J. Knowles, vice president and treasurer, will succeed Charles H. Hutchins as president and John F. Tinsley, formerly superintendent of the south works of the American Steel & Wire Co., Worcester, will become general superintendent.

The Chain Belt Co., Milwaukee, on Jan. 1 announced several important promotions in its official force, which now consists of the following: Chairman of the board, C. W. Levalley; president, William C. Frye; first vice president, C. R. Messinger; second vice president and works manager, William I. Ballentine; third vice president, Frederick L. Sivyer; consulting engineer, Donald Fraser; secretary, William E. Sargent; treasurer, C. L. Pfeifer; assistant secretary, G. B. Welser Jr. Mr. Messinger, the new first vice president, is vice president of the Sivyer Steel Casting Co. and Federal Malleable Co., Milwaukee. Mr. Ballentine went to the Chain Belt Co. in October, having been president of the Ballentine-Bixby Co., Indianapolis. Mr. Pfeifer was comptroller for three years and Mr. Welser was graduated from the college of engineering, University of Wisconsin, in 1913.

Exporters of Tools Maintain Pace

Equipment for Use Abroad Inquired for Heavily While the Railroads at Home Place Huge Lists With Machine Builders—Ship Yards Again Coming Into Limelight

THE export demand continues to be a leading feature of the machine tool market. Bids are being taken on a large number of export inquiries which are expected to be closed in the near future. Among export lists which will likely be closed within a few days is one for 150 lathes and another for 100 lathes. From the large miscellaneous lists now before the trade, is one from Jas. M. Motley, 71 Beaver street, New York, who is taking prices on a large number of steam hammers, lathes, boring mills, planers, shapers, etc., involving an outlay of several hundred thousand dollars. These tools are wanted for the earliest delivery possible, and are for export. The Dnieper Works in southern Russia has placed an important order for railroad shop equipment, including car wheel and car box borers, wheel lathes and axle lathes. The Baldwin Locomotive Works has purchased three driving wheel and two car wheel lathes for export.

Considerable business continues to come from the railroads. Some important purchases have been made by the Lehigh Valley railroad, which is planning to built several repair shops at different points along its lines. The Baltimore & Ohio has placed some additional tools and the Chesapeake & Ohio has made some small purchases. The United States government's requirements are assuming large proportions. The Watervliet and the Rock Island arsenals have placed orders for a large number of machine tools each. The Rock Island arsenal is shortly expected to ask for quotations on approximately $2,000,000 worth of tools, including a large quantity of rifle machinery. Heavy lists also are expected to materialize from other arsenals and from some of the navy yards. Orders for a number of cranes for installation in the Norfolk and League Island navy yards have been placed with the Niles-Bement-Pond Co. and the Penn Bridge Co. One of the most important projects now being developed in the east is the new plant for making ship and ship building equipment which is to be located by the Westinghouse Electric & Mfg. Co., at Essington, Pa. Bids now are being taken on two machine shops, a foundry, a pattern storage and an assembling shop, involving altogether 7,500 tons of steel. These buildings are to comprise the first unit of the proposed plant. A large number of 100-ton, 50-ton and smaller cranes are called for in the plans. Machine tool prices continue to show an upward tendency. One manufacturer is quoting 5 per cent higher on shapers for delivery in January and February, and 10 per cent higher for March and later delivery. A manufacturer of hand screw machines has advanced his prices by 15 per cent.

The Bethlehem Motor Corporation, Allentown, Pa., has started work on an addition. The Goldschmidt Thermit Co., New York, is to build a large plant in Jersey City. The Donner Steel Co., Buffalo, contemplates the erection of a new steel mill. The General Electric Co. is about to erect a large foundry at Schenectady, N. Y. The Worcester Machine Works, Worcester, is enlarging its capacity. The Continental Wood Screw Co., New Bedford, Mass., plans to build an addition in the spring. The Southern Transportation Co., Philadelphia, is about to locate a ship building and repair plant at Norfolk, Va. The Norfolk & Western railroad contemplates the erection of repair shops at Shenandoah, Va. The Lake Torpedo Boat Co., Bridgeport, has authorized the construction of another large machine shop and several additions. The Stamford Rolling Mills, Stamford, Conn., is about to erect an addition.

Chicago Market Dull

GENERAL business in the machine tool market in the Chicago district continues to be active, the slight lull at holiday time having been only temporary, and the demand is of a general nature. The Chicago, St. Paul, Minneapolis & Omaha railroad is closing for part of the equipment inquired for on a recent list. Other railroads which have issued lists have not yet closed. Comparatively little second-hand machinery is coming into the market.

Good Inquiries Coming into Pittsburgh

FURTHER evidence of continued heavy buying is reflected by additional inquiries for machine tools and rolling mill equipment in the Pittsburgh district. Numerous inquiries have come out recently for boring mills, planing and milling machines, and dealers state that deliveries are considerably more deferred than they were the latter part of 1916. Several concerns have been asked to quote on 60 tools for the Erie, Pa., plant of the General Electric Co. The Abramsen Engineering Co., Pittsburgh, is equipping a plant at Bellefonte, Pa., for the manufacture of bar straightening machinery. The Sistersville Boiler Works has been buying punching and shearing machinery for an addition to its plant at Sistersville, W. Va. The Erie City Iron Works, Erie, Pa., has awarded contracts for an addition, 38 x 229 feet, and likely will buy additional equipment. The Jones & Laughlin Steel Co. recently placed orders for a new plate mill, which will be installed in its Soho works, Pittsburgh. It is reported that the Donora & Southern railroad, operated by the American Steel & Wire Co., will be in the market shortly for shop equipment.

Cincinnati Market Picking Up

THE machine tool market in the Cincinnati territory has shown improvement in the past few days. Manufacturers report that following the lull that usually comes during the holidays single tools of various types were in demand. Sales to European nations are not heavy. Inquiries for small electrical equipment are as heavy as at any time in the history of the market. The Andrews Steel Co., Newport, Ky., has purchased equipment to electrify its entire plant, but may be in the market for a few additional motors. Thomas J. Nichol & Co. is inquiring for four motors, to cost about $2,000, to be used in the new building of the Ohio Medical college, Cincinnati.

Cleveland Market Firm

MACHINE tool dealers in the Cleveland territory are being flooded with inquiries. Lists that have been issued recently by several local concerns call for

Little but a *Powerful Worker*

The spunky little tug whose duty it is to keep the river open, charges and charges against the ice with the same resistless vigor and persistence that marks the football star who consistently hits the line for gains. We are almost forced to cheer as we watch it batter and ram its way onward. ***But,*** the little tug could not do this if its engine parts were not made of the right materials.

AGATHON STEELS

"AGATHON" Chrome Nickel "AGATHON" Vanadium
"AGATHON" Chrome Vanadium "AGATHON" Chrome Steel
"AGATHON" Nickel Steels "AGATHON" High Carbon
"AGATHON" Special Analyses

"AGATHON" STEELS have thoroughly proved their superiority for the manufacture of ***Gears, Cams, Crank Shafts, Driving Shafts, Pistons, Connecting Rods, Axles,*** etc.

They are manufactured especially for those who require safety, reliability, durability and economy.

Write us!

The Central Steel Company
MASSILLON, OHIO

BRANCH OFFICES:

Detroit Office: 326-27-28 Ford Bldg., F. Walter Guibert, District Representative
Cleveland Office: Hickox Bldg., The Hamill-Hickox Co., District Representative
Chicago Office: Room 1511-12 Lytton Bldg., 14 East Jackson Blvd., A. Schaeffer, District Representative
Philadelphia Office: 902 Widener Bldg., Frank Wallace, District Representative
J. E. Dockendorff & Co., 20 Broad St., New York, N. Y., General Export Agents

a wide line of equipment. The smaller manufacturers needing equipment in lots of one or two tools are besieging the dealers for milling machines, grinders and shapers. These three types of machines seem to be in the greatest demand and a number of the inquiries state that while immediate delivery is greatly desired, the order is to be entered regardless of what the shipping dates may be. This attitude on the part of manufacturers reflects a sound condition of business and the general tone of the market is solid. As a further evidence of the stability of the machine tool situation, the price advance, recently noted as pending, has been put into effect. One local dealer states that since the price revision, business closed has been greater than during the same length of time immediately preceding the advance, when many manufacturers were taking advantage of the prevailing quotations. It is reported that the Timken Detroit Axle Co., Detroit, has purchased a plant in Sandusky, which had previously been used for the manufacture of cement, and is organizing a forge company. It is stated that the Timken company has purchased a large amount of forging equipment, but has not yet closed for all its requirements.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

Among New England Factories

AUBURN, ME. — The Androscoggin Trust Co. plans to build a brick and steel, fireproof, 1-story building to cost $50,000.

BOSTON.—The W. D. Sawyer estate will build a reinforced concrete, fireproof, 6-story, light manufacturing building at Portland and Traverse streets.

BOSTON. — The Independent Machinery & Tool Co. has been incorporated with $50,000 capital by John G. Cowie, president; George Young, treasurer, and J. A. Hay, clerk.

BOSTON. — The Realty Investment Trust has been granted a permit for a brick and limestone, steel frame, 11-story office building to cost $500,000 at Beacon and Somerset streets.

BOSTON.—The W. D. Young & Co., Inc., have been incorporated to manufacture surgical instruments with $60,000 capital by William D. Young, Malden, Mass., president; Gilbert E. Young, Malden, treasurer and clerk, and James A. Bigelow, Waltham, Mass.

BOSTON. — The Cutter & Wood Supply Co. has been incorporated to deal in iron, tools, machinery, etc., in this city and in Providence, R. I., with $90,000 capital by Walter S. Wood, president; William H. Mulholland, treasurer, and H. R. Bygrave.

BROCKTON, MASS. — Hyman E. Cline, Boston, will build a brick, fireproof, 6-story, 60 x 150-foot building at Centre street and Railroad avenue.

CAMBRIDGE, MASS.—The Sterling Products Co. has been incorporated to manufacture machinery with $150,000 capital, by R. C. Cox, A. W. Blair, et al.

CHELSEA, MASS.—Spivach & Matkofsky will build a brick, 1-story, 51 x 75-foot factory building at 204 Maverick street.

LOWELL, MASS.—The W. H. Bagshaw Co. has been incorporated to build general machinery with $75,600 capital, by Charles H. Bagshaw, president; M. C. Bagshaw, treasurer, and Walter J. Bagshaw, clerk.

MANSFIELD, MASS.—The New England Drawn Steel Co. has let contract for two wood and steel, 1-story, 50 x 250-foot and 44 x 50-foot buildings.

MARBLEHEAD, MASS.—The Burgess-Curtis Co. will build a brick and steel, 2-story, 100 x 300-foot building to cost $60,000 on the site of the old gas house, Little Harbor.

SOUTH BRAINTREE, MASS.—The Monatiquot Rubber Co. has let contract for a brick, mill construction, 2-story, 60 x 200-foot addition to its factory off Hancock street.

SOUTHBRIDGE, MASS. — The Hamilton Woolen Co. has let contract for a brick, mill construction, 2-story, 64 x 160-foot mill to cost $45,000 on River street.

SPRINGFIELD, MASS.—The Harley Co. has been incorporated to manufacture metals, machinery and tools with $1,200,000 capital by Leon J. Harley, president; Leon J. Harley Jr., treasurer, and Charles H. Beckwith, clerk.

WATERTOWN, MASS.—Hood Rubber Co. has let a contract for the erection of a 2-story, 80 x 160-foot foundry and pattern shop.

WORCESTER, MASS. — Plans are being figured for a brick, 1-story, 70 x 334-foot nail mill to cost between $40,000 and $50,000 for the central works of the American Steel & Wire Co. on Kansas street.

WORCESTER, MASS. — The Worcester Shock Absorber Co. has been incorporated with $15,000 capital by J. Philip Bird, New York, president; Frank H. Willard, treasurer and F. A. Waldron.

WORCESTER, MASS. — The Worcester Stamped Metal Co. has been incorporated with $150,000 capital by Harry R. Sinclair, president; Frank E. Billings, treasurer and B. M. Whittle.

BERLIN, CONN.—The Berlin Construction Co. has been incorporated with $300,000 capital by George T. Sage, Seymour N. Robinson and Daniel E. Bradley, all of Hartford.

NEW BRITAIN, CONN.—Stanley Works is about to erect a new plant addition.

STAFFORD SPRINGS, CONN.—The mill building of Smith & Cooley was burned with $50,000 loss.

STAMFORD, CONN.—The Erskine-Danford Corporation will build a mill-construction, 2-story, 150 x 200-foot building at Pacific and Dock streets.

WATERBURY, CONN. — Waterbury Foundry Co. has let a contract for the erection of a 1-story, 30 x 60-foot foundry addition.

WATERBURY, CONN.—Platt Bros. & Co. have let a contract for the erection of a 1-story, 40 x 150-foot plant addition.

WATERBURY, CONN.—The Chase Rolling Mill Co. and the Chase Metal Works, which will build a brick, concrete and stone, 4-story, 50 x 260-foot office building to cost $600,000 at Grand and Leavenworth streets, contemplate erecting two wings and a 6-story annex to it.

WILLIAMSVILLE, CONN.—The Goodyear Tire & Rubber Co. has started work on a 7-story, 110 x 120-foot addition to its plant.

NEWPORT, R. I.—Plans have been drawn for a brick and concrete, fireproof, 3-story and basement, 68 x 182-foot building to cost $105,000 at the naval torpedo station.

PAWTUCKET, R. I.—The Tamarack Co. has let contract for a brick, 3-story and basement, 110 x 193-foot addition to its plant on Conant street.

Along the Middle Atlantic Seaboard

NEW YORK.—The Atlantic Railway Materials Corporation has been incorporated to manufacture supplies and materials, with $15,000 capital, by I. L. McCord, H. Leerburger, I. F. Duke, 42 Broadway.

SHOOTERS ISLAND, S. I., N. Y.—Standard Ship Building Corporation has let a contract for the erection of a 1-story, 120 x 400-foot boiler shop to cost about $125,000.

BORDENTOWN, N. J.—George W. Smith Jr., has been incorporated to manufacture and deal in paper making machinery, with $200,000 capital, by George W. Swift Jr., Hobart W. Bruker and Elmer B. Ayres.

ELIZABETHPORT, N. J.—Stamford Electrical Fittings Co., Stamford, Conn., is about to erect a 1-story, 100 x 340-foot plant here. Plans have been completed by the S. H. Ogden Co., Union building, Newark, N. J.

JERSEY CITY, N. J.—Jos. T. Ryerson & Son, 30 Church street, New York, are about to erect a 1-story, 50 x 100-foot warehouse addition here.

JERSEY CITY, N. J.—Allen Valve Mfg.

Telegram From

ROLLING MILL JIM

Hubbard Steel
Foundry Company,

East Chicago, Ind.

Enter order for two sets Bloomers, same analysis as last. Broke all records on the Hubbard Specials last year.

So long—

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

Co. has been incorporated to manufacture and deal in patented valves and machinery, with $75,000 capital; by John H. Allen, Orange; William F. Mandill, New York; Perry Haynes, Jersey City.

NEWARK, N. J.—The Manufacturers Tire & Rubber Co. has been incorporated with $100,000 capital by Eric Windmiller, Passaic; Herman Feder, Newark, and J. S. Galland, New York.

NEWARK, N. J.—F. S. Gassaway Co. has been incorporated to manufacture and deal in storage batteries and automobile accessories, with $100,000 capital, by William A. Smith, Thomas S. Woodruff, Florence I. Ennis, Newark.

TRENTON, N. J.—The Electric Porcelain & Mfg. Co. will erect a $30,000 addition to its plant on New York avenue.

TRENTON, N. J.—Bayuk Bros., Philadelphia, have contracted for 3-story, 40 x 100-foot factory, of slow burning construction, to be located on Adeline street.

TRENTON, N. J.—The Westinghouse Lamp Co. has purchased 5½ acres, and will erect a plant for the manufacture of incandescent lamps.

WALLINGTON, N. J.—American Jobbers Supply Co. has been incorporated to manufacture and deal in electrical machinery and appliances, with $50,000 capital; by William M. Carpenter, Marcellus L. Josly, Albert G. Jarmin, Ernest S. Hough, Chicago, Ill.

PHILADELPHIA.—Plans have been completed for a 1 and 2-story, 200 x 700-foot structural shop to be added to the League island navy yard at a cost of about $600,000, a 1 and 2-story, 225 x 500-foot foundry to cost $500,000, and a machine and electrical shop, 150 x 500-foot, to cost $500,000, also will be added.

NEW CASTLE, PA.—Arrangements are being made to start the construction of a new plant for the Pull-More Truck Co. The Austin Co., Cleveland, has the contract for the first unit, which will be 100 x 500 feet.

BALTIMORE.—Continental Can Co. has let a contract for the erection of a 1-story, 100 x 300-foot plant.

SOLLERS, MD.—The Aluminum Ore Co., East St. Louis, Ill., stock of which is owned by the Aluminum Company of America, Pittsburgh, plans to erect a plant, to manufacture anhydrate of aluminum from bauxite ore, to cost about $700,000.

Activities in the Central States

BROOKLYN.—American Can Co. is about to erect a 1-story, 100 x 200-foot manufacturing and garage building here.

BROOKLYN.—The Horne Mfg. Co. has been incorporated to manufacture signaling devices, brakes, etc., with $50,000 capital, by L. W. Horne, R. L. and A. C. Henry, Inwood.

BUFFALO.—The Ferguson Steel & Iron Co. has let a contract for the erection of a new frabricating shop to cost about $200,000.

BUFFALO.—Strong Steel Foundry Co. has let a contract for the erection of a 1-story, 25 x 80-foot foundry addition.

BUFFALO.—Globe Pattern Works has completed preliminary plans for a 2-story, 30 x 100-foot pattern shop.

BUFFALO, N. Y.—The Buffalo Society of Natural Science plans to build a museum, to cost about $200,000. Green & Wicks, 110 Franklin street, are preparing the plans.

BUFFALO.—The Thompson Heater Corporation has been incorporated to manufacture boilers and radiators, with $150,000 capital, by F. A. Abbott, H. M. Jack and R. E.

DUNKIRK, N. Y. — The Atlas Crucible Stel Co. has awarded the McClintic-Marshall Co., Pittsburgh, a contract for erecting a 1-story rolling mill, 70 x 400 feet.

EAST AURORA, N. Y. — Forsythe Metal Goods Co. has let a contract for the erection of a 1-story, 50 x 130-foot plant.

LOCKPORT, N. Y.—The Harrison Mfg. Co. has awarded the American Concrete Steel Co., 27 Clinton street, Newark, N. J., a contract for erecting a 2-story factory building, 163 x 396 feet, at Elm and Walnut streets, to cost $250,000.

OSWEGO, N. Y.—This city is having plans drawn by Engineer John A. Bensel, 111 Broadway, New York, for a new hydro-electric plant to be built at a cost of about $600,000.

ROCHESTER, N. Y.—The Eastman Kodak Co. has awarded the Ferro Concrete Construction Co., Cincinnati, a contract for erecting a reinforced concrete factory building, to cost $50,000.

SYRACUSE, N. Y.—The Onondaga Pottery Co., 1858 West Fayette street, plans to erect a 1 and 4-story warehouse, 98 x 208 feet. Russell & King, 602 Snow building, are preparing the plans.

ALTOONA, PA. — The Schwarzenbach-Huber Co. plans to build an addition, to cost about $100,000.

ALTOONA, PA.—The Pennsylvania Railroad Co. plans to reconstruct the bridge across Mill Run stream, on the Hollidaysburg branch, at Thirty-first street.

ASPINWALL, PA.—The board of education plans to erect a 2-story high school, 75 x 160 feet, to cost $75,000. P. C. Dowler, Arrott building, Pittsburgh, is preparing the plans.

BUTLER, PA.—The board of education plans to build a high school. W. G. Eckles, New Castle, is preparing the plans. H. L. Graham is secretary of the board.

CLAIRTON, PA.—The Carnegie Steel Co. has awarded the Rust Engineering Co., Farmers Bank building, Pittsburgh, a contract for constructing 10 200 x 9.5-foot tapered reinforced concrete chimneys for new coke ovens being built by the H. Koppers Co.

DANVILLE, PA.—City plans to construct a reservoir. Chester & Fleming, hydraulic engineers, Union Bank building, Pittsburgh, are preparing the plans.

DOYLESTOWN, PA.—Bucks county plans to construct a bridge over Wilson run, 1 mile southwest of Taylorsville.

DUBOIS, PA.—The board of education plans to build a high school. J. G. Miller is president of the board.

ERIE, PA.—The city of Erie plans to construct a tube or conduit in the city for flood control of Mill creek, Erie county.

FARRELL, PA.—The board of education plans to build a school at Hamilton avenue and Bond street, to cost about $75,000.

GLEASANTON, PA.—L. R. Gleason & Son, plan to double the size of their plant, to cost $60,000.

GLENSIDE, PA.—The Sacred Heart Roman Catholic parish will erect a church, 68 x 150 feet. H. G. Hammer is preparing the plans.

JOHNSTOWN, PA.—Swank Hardware Co. is about to erect a new 3-story, 54 x 116-foot hardware plant.

JOHNSTOWN, PA.—Cambria county, the city and the Johnstown Traction Co. jointly plan to construct a bridge to cost about $77,000.

NEW BEDFORD, PA. — Supervisors of Pulaski township, Lawrence county, plan to construct a bridge across a run, about 1 mile northwest of New Bedford.

NEWTON, PA.—Board of education plans to erect a 2-story addition, 76 x 82 feet. E. F. Bertolet is preparing the plans.

PITTSBURGH.—The Pennsylvania railroad plans to construct a bridge across Mahoning creek, Armstrong county.

PITTSBURGH.—The Denny Estate plans to build a steel tank and pump shed at the foot of Thirty-fifth street, to cost about $15,000.

PITTSBURGH. — The American Abrasives Co. has been incorporated with a capital stock of $50,000, to manufacture burstones and abrasives; by E. G. Niesawaner, L. L. Voight and George M. Harton, all of Pittsburgh.

PITTSBURGH. — The First Presbyterian church plans to erect an edifice, to cost about $192,200.

PITSBURGH. — The Carnegie School of Technology plans to build a dormitory, to cost about $100,000.

PITTSBURGH. — The May Keleher Co. plans to build an addition to its garage and salesroom at South Negley and Center avenue.

PITTSBURGH.—The plant of the Holliday Chemical Co., Preble and Columbus avenues and Magnolia and Juniata streets, was damaged by fire recently. The loss is estimated at $16,000.

POTTSTOWN, PA. — North American Motors Co., Geo. R. Bidwell, secretary, has completed plans for a 1 and 2-story, 150 x 250-foot plant, to be erected here.

READING, PA.—Dundore Mfg. Co., tools and machinery, has let a contract for the erection of a new plant.

SALISBURG, PA.—Supervisors of Loyalhanna township, Westmoreland county, plan to construct a bridge across Getty run, about 3 miles southwest of Salisburg.

TOWANDA, PA.—Bradford county plans to construct a bridge over the south branch of Sugar creek on Mud creek road, 2.5 miles southeast of Troy borough.

UNIONTOWN, PA.—Fayette county and Luzerne township, plan to construct a bridge over Bull Run, 2 miles southwest of South Brownsville.

UNIONTOWN, PA.—The Oliphant Coal & Coke Co. has been incorporated with a capital stock of $25,000; by William E. Crow, F. R. Crow, H. A. Martenslager, all of Uniontown.

UNIONTOWN, PA.—The Faith Coal Co. has been incorporated with a capital stock of $5,000; by A. J. Lewis, W. J. Kearns, J. C. Cramer, all of Uniontown, and William Ball, Isabelle.

WARREN, PA.—The Allegheny Steel Tank Car Co. has been incorporated with a capital stock of $100,000; by G. L. Craft, U. G. Lyens, H. D. Kopf, A. J. Hazeltine, H. A. Logan, Joseph A. Schofield, all of Warren, and William Muir, Titusville.

WILLIAMSPORT, PA. — Williamsport Lodge No. 173, B. P. O. Elks plans to build a club house.

WILLIAMSPORT, PA.—City plans to construct a bridge over Grafius run at Louisa street. J. B. Otto is the city engineer.

WILLAMSPORT, PA.—State plans to construct the Newbarry-DeBoistown and Montgomery bridges. Henry C. Reeder, court

Blackwood
STEELS

The illustration below shows part of an order for a large quantity of pots. These pots were wanted in an unusual hurry, but we got them off right on scheduled time.

We specialize the making of

CASE HARDENING BOXES

and

LEAD AND CYANIDE POTS

made of specially prepared steel.

If you are a user of Superfine Steel Castings and want good service, investigate

OUR 8-DAY DELIVERY SCHEDULE—IT WILL INTEREST YOU!

Our immense steel foundry has capacity and facilities that enable us to give you ***highest quality work*** and ***prompt delivery.***

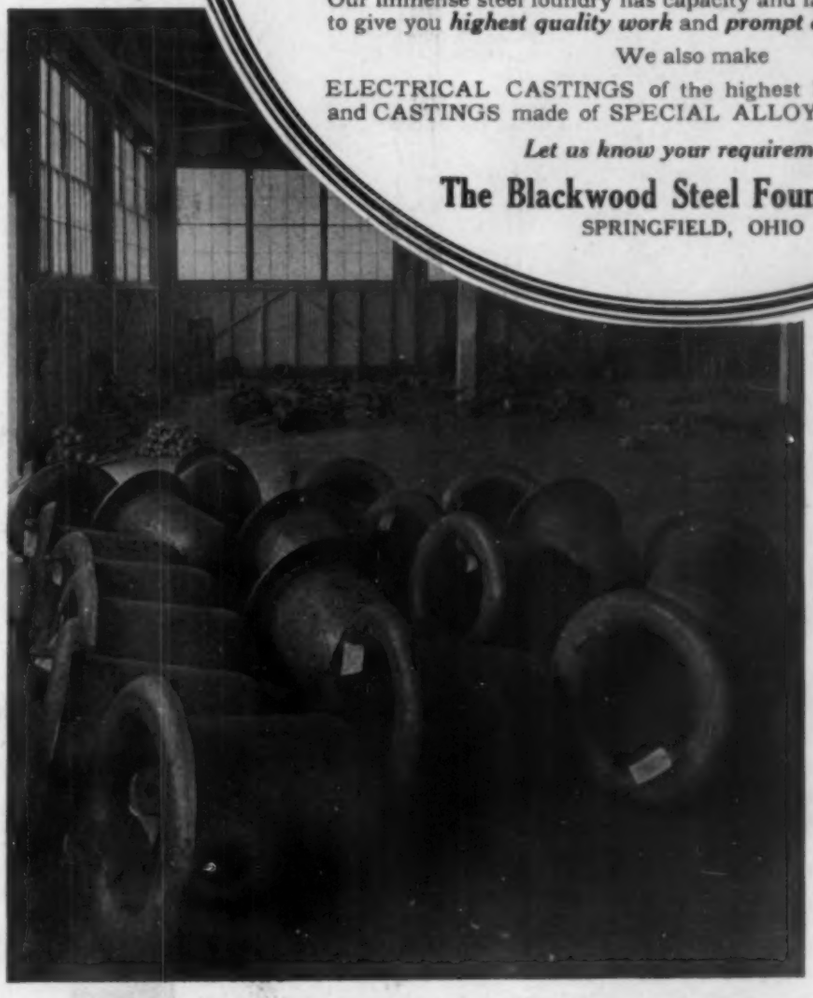
We also make

ELECTRICAL CASTINGS of the highest Magnetic Permeability and CASTINGS made of SPECIAL ALLOYS.

Let us know your requirements

The Blackwood Steel Foundries Co.

SPRINGFIELD, OHIO



Say you saw it in THE IRON TRADE REVIEW

house, Williamsport, is the engineer in charge of the work.

AKRON, O.—The General Tire & Rubber Co. was granted a permit to build a $50,000 addition to its plant.

BELPRE, O.—The International Air Brake Co. has secured a site just outside the city limits on which it plans to build a 40 x 300-foot factory.

CANTON, O. — The stockholders of the Metropolitan Brick Co. contemplate extensive additions to their plant.

CANTON, O.—The Homes Automobile Co. plans to incorporate with $2,500,000 capital to manufacture air-cooled automobiles and plans to establish a plant here.

CINCINNATI.—The Davenport Paper Co. is having plans prepared for a paper-making plant to be erected at Pike and Pearl streets.

CINCINNATI.—The Heekin Can Co. has roof construction, with steel trusses to support the roof.

CINCINNATI.—The Cincinnati Planer Co., Oakley, will build an addition to its main shop 80 x 150 feet, to cost about $50,000. The new portion will be of lantern roof construction to match the present building. The roof will be supported by steel trusses, and the present steel crane-way in the main shop will be extended 80 feet. The steel work will cost about $9,000. The company recently completed a casting shed, 65 x 150 feet.

CLEVELAND. — The Richards Auto Mfg. Co. plans factory extensions at 7800 Finney avenue, to cost $40,000.

CLEVELAND. — The Euclid-Doan Realty Co. has filed plans with the building department for a 4-story commercial and hotel structure to be erected on East 105th street, near Euclid, and to cost $500,000.

CLEVELAND.—The Ohio Forge Co. has horizontal boring mill with 3½-inch spindle. A Lucas machine is preferred. Prompt delivery is essential.

CLEVELAND.—The Carey Co., dealer in roofing and asbestos material has secured a 10-year lease on property at 5716 Euclid avenue which it plans to improve at an expense of $25,000 within the next three years.

CLEVELAND.—The Cleaner Mfg. Co. has been incorporated to manufacture suction cleaners with $25,000 capital, by J. H. Smart, George Wyman, W. T. Bishop, C. B. Ford and W. W. Watkins.

CLEVELAND.—The Fred P. Brand Motor Co., agent for the Pierce-Arrow automobile, has completed arrangements with the Joseph Laronge Co., Cleveland, for a $150,000 service station and garage to be erected at Carnegie avenue and East Forty-sixth street.

CLEVELAND.—Architect W. W. Hodges,

Sidelights on the Industry

Durfur, Baggot & Co., manufacturers of brass and steel wire work, Baltimore, announce a change of address from 225 West Saratoga street to 403 North Paca street, where they will have larger and better quarters.

* * *

The Nelson Co., Menominee Falls, Wis., founder and machinist, specializing in transmission and factory supplies, has changed its name to the Menominee Falls Mfg. Co. J. B. Whitacre is president and C. F. Henrizi is secretary of the company.

* * *

The Philadelphia office of Charles Dreifus & Co., dealers in iron and steel scrap, has been moved from the Pennsylvania building to 1312 Widener building.

* * *

The Ladish-Ogenberger Co., Cudahy, Wis., formerly the Odenberger Drop Forge Co., has changed its corporate style to the Ladish Drop Forge Co. The company is now producing about four tons of forgings a day.

* * *

The main offices of the following companies have been moved to the Queens Subway building, Hunters Point and Van Alst avenues, New York City: Degnon Contracting Co., Degnon Realty & Terminal Improvement Co., Tubes Realty Co., Hunters Point Lumber & Supply Co., Anable Avenue Factory Corporation, New York & New Jersey Construction Co., Kingsbridge Mfg. Co.

The Puls[illegible] Pump Co., Irvington, N. J., has opened a branch office in Detroit. The office will be under the management of John Cavan and will be located on the fourth floor of the Penobscot building.

* * *

H. P. Binswanger, New York, dealer in ores and minerals, has secured more commodious quarters at 1616-1617 Postal Telegraph building, 253 Broadway, New York.

* * *

John Helmuth & Co., iron and steel dealers, have removed their offices from the Oliver building, Pittsburgh, to the Union Bank building, Pittsburgh.

* * *

The Cleveland Galvanizing Works Co., Cleveland, manufacturer of weldless wire chain and of pattern shop and foundry supplies, has established a Chicago branch at 334 New York Life building, 39 La Salle street, in charge of W. A. Ahrens. The company recently has enlarged its capacity by adding another extensive unit to its factory group.

* * *

The United Hammer Co., Boston, has purchased the power hammer business of the E. & T. Fairbanks Co., St. Johnsbury, Vt. These hammers were first manufactured in 1890 by the Dupont Mfg. Co. The business of the Dupont company was acquired in 1902 by the Fairbanks company.

purchased an adjoining building for $200,000, in order to increase manufacturing facilities.

CINCINNATI.—The G. A. Schacht Motor Truck Co. has increased its capital stock from $25,000 to $100,000. The company's facilities will be expanded.

CINCINNATI.—Architects Werner and Adkins, 1209 Mercantile Library building, are taking bids on the sub-structure for a factory and office building to be two stories and basement, 145 x 169 feet, for the American Rolling Mills Co., to cost $125,000. Bids on the superstructure will be taken this month.

CINCINNATI.—The Ohio Pattern Works & Foundry Co. has been incorporated at $200,000, by Jos. E. Hausfeld, A. S. Hausfeld, E. B. Hausfeld, Victor E. Tresise, and G. L. Tresise. These same stockholders have been operating the Ohio Pattern Works, 2730 Spring Grove avenue, this city.

CINCINNATI. — The Acme Machine Tool Co. will build a new factory building in Oakley, adjoining the present plant of the Cincinnati Planer Co., both of which are controled by the same stockholders. The new building will be 25 x 400 feet, of lantern

secured a site at Woodhill and Kinsman roads, on which it plans to build a plant to cost about $100,000. The concern at present is located at 2186 East Sixty-fifth street.

CLEVELAND.—The Cleveland Motor Plow Co., Euclid, O., has let the contract for the second building of its new factory group and is now working on plans for further additions.

CLEVELAND.—W. C. Owen & Co., 1900 Euclid avenue, will take bids about Jan. 20 for a rubber factory for the Boon Tire & Rubber Co., Sycamore, Ill. It will be of fireproof construction and will cost $60,000.

CLEVELAND. — Architects W. C. Owens & Co., 1900 Euclid avenue, are ready to receive bids for a tire factory for the A. L. A. Tire Co., Detroit, to cost $100,000. The building will be two stories, 92 x 108 feet.

CLEVELAND.—Engineer C. W. Cortney, Leader-News building, is ready to receive bids for a new boiler house for the Cleveland Cooperage Co. The structure will be 35 x 45 feet and will cost $15,000.

CLEVELAND.—The Atlas Car & Mfg. Co. is in the market for a new or second-hand

Schofield building, has completed preliminary plans for a factory building for J. H. Rock, 507 Williamson building, to be erected at East Twenty-sixth street and Superior avenue to cost $200,000.

CUYAHOGA FALLS, O. — The Turner Vaughn & Taylor Co. is erecting a large foundry in place of the one it recently tore down.

DAYTON, O. — Equipment for a water pumping station, three stories, 17 x 17 feet, to cost $14,000 will be purchased soon by the city of Dayton.

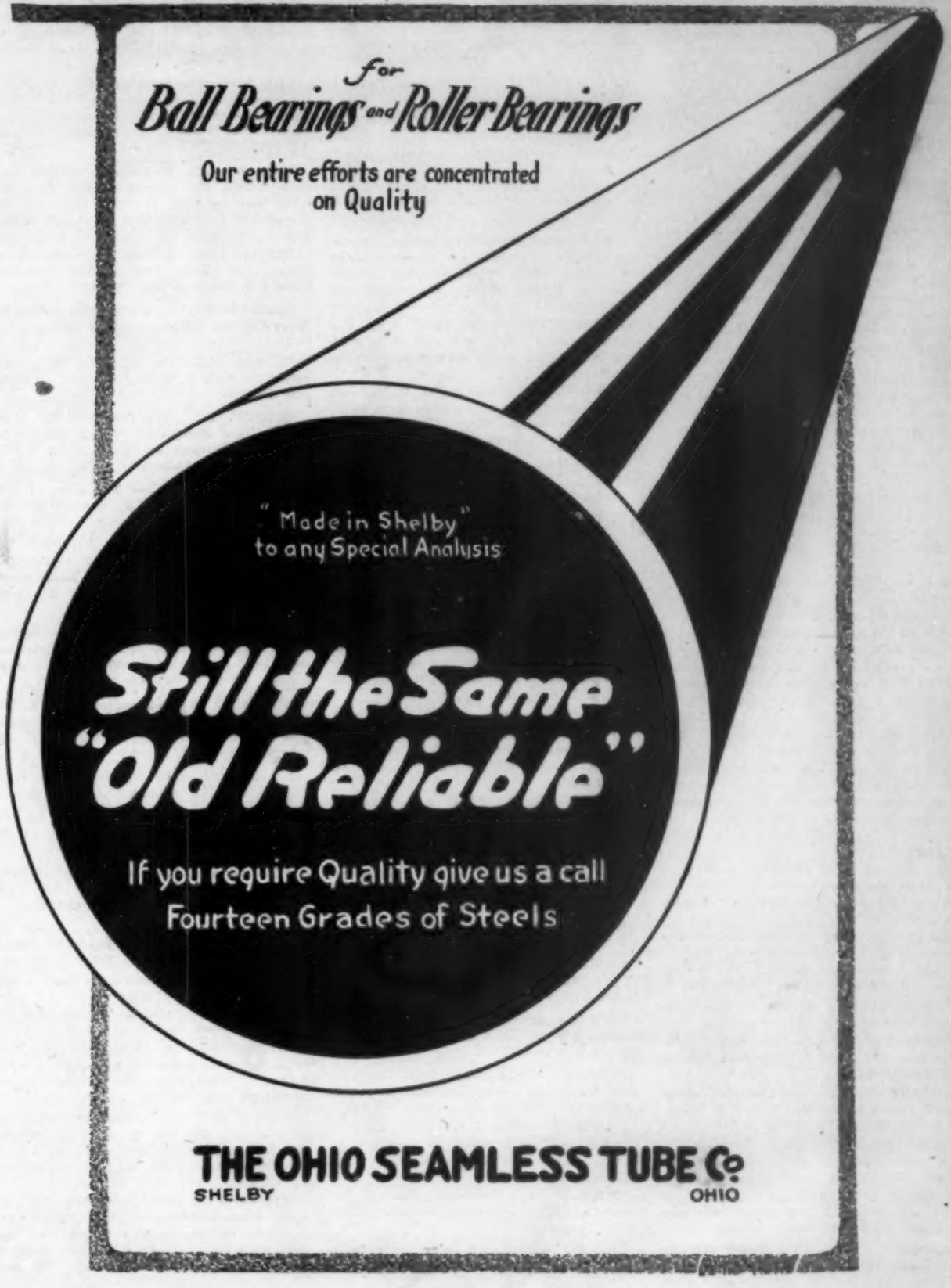
DEFIANCE, O.—The B. & O. railroad plans to spend about $45,000 in the spring to improve its passenger station here.

ELYRIA, O.—The I. G. S. Rubber Co. immediately will begin to erect a building adjoining its present plant to be 50 x 96 feet, two stories, and to cost $15,000.

FOSTORIA, O.—Reconstruction work has been started in the Auto Body Factory which was recently damaged by fire. The building will be 65 x 292 feet, one story.

MARION, O.—C. L. LaMarche has taken a permit for the construction of a factory

"OHIO SPECIAL"
Cold Drawn Seamless Steel Tubing


for
Ball Bearings and Roller Bearings
Our entire efforts are concentrated on Quality
"Made in Shelby" to any Special Analysis
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Fourteen Grades of Steels
THE OHIO SEAMLESS TUBE Co.
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building to cost $20,000 and to be used as a core room addition to the plant of the American Malleable Castings Co.

MARYSVILLE, O. — C. C. Armstrong, manager of the Standard Stamping Co., states Architect E. M. Alger, Huntington, W. Va., has completed plans for a 1-story factory building, 200 x 200 feet, to cost $50,000. Bids will be taken about Jan. 15.

NORWOOD, O.—The Allis-Chalmers Co. will enlarge its plant at this place by the addition of 20,000 square feet of floor space. The company now has five buildings, and in the intervening spaces between them, one story additions will be erected of concrete and steel. The cost will be $50,000.

SANDUSKY, O.—The Vulcan Forge Co. will arrange at once to erect three additions to its plant to be ready for use within six months.

SEVILLE, O.—The Overholt Mfg. Co. has been incorporated with $40,000 capital by I. M., F. M. and J. R. Overholt, G. F. Miller and A. R. Beir.

SPRINGFIELD, O.—The O. S. Kelley Co. has preliminary plans for a proposed factory building to be 200 x 225 feet, of fireproof construction. It will be used as a finishing plant of the company, which manufactures piano plates.

TOLEDO, O.—The Mather Mfg. Co. has been incorporated with $60,000 capital by J. S. Mather, L. G. Gardner, E. A. Koster, et al.

YOUNGSTOWN, O. — The Standard Slag Co. has increased its capital from $250,000 to $500,000 to provide for extensive improvements.

YOUNGSTOWN, O.—The Whitaker-Glessner Co. has awarded the William B. Pollock Co. the contract for the erection of the 500-ton blast furnace at Portsmouth.

YOUNGSTOWN, O.—D. J. Wilkoff, of the Wilkoff Co., Wilson avenue, announces that the officers are planning to increase the capital of the company from $300,000 to $600,000, to provide for extensive improvements.

CHARLESTON, W. VA.—A. Klipstein & Co. has awarded the W. L. Crow Construction Co., 103 Park avenue, New York, a contract for erecting a 4-story refrigerating plant, 58 x 120 feet.

KANAWHA, W. VA.—The American Bottle Co. plans to erect a plant.

LEWIS, W. VA.—The Roessler & Hasslacher Chemical Co., Perth Amboy, N. J., has awarded the C. W. McNulty Co., Charleston, a contract for erecting a plant, to cost $1,000,000.

MARTINSBURG, W. VA.—Marshall Field & Co., Chicago, have purchased 1,200 acres near Martinsburg, on which they plan to erect factories and mills which will employ about 5,000 hands.

NORTH MOUNTAIN, W. VA. — The Staunton City Clay Products Co., Newark, O., plans to erect three buildings, 45 x 90 feet, 80 x 96 feet and 46 x 720 feet, respectively.

WHEELING, W. VA.—The Warwood Tool Co. will build an addition to its factory.

WHEELING, W. VA.—Ohio county commissioners, with offices in Wheeling, plan to build three bridges.

LOUISVILLE, KY.—The Kentucky Culvert Co. will erect a 1-story steel factory at Thirty-first and Walnut streets, to cost $12,000.

AUBURN, IND.—The Auburn Foundry Co., B. A. Fink, president, will rebuild its burned factory.

AUBURN, IND. — DeKalb county, S. P. Nelson, county auditor, will receive bids soon for several reinforced concrete bridges.

ELKHART, IND. — The Foster Machine Co., manufacturer of screw machines and turret lathes, announces additions costing $70,000 will be built to its plant in the near future. A total of $50,000 in new equipment is to be purchased.

FRANKFORT, IND.—The Indiana Brass Co. has been incorporated with $100,000 capital to manufacture building fixtures, by J. A. Johnson, C. E. Williams, T. M. Ryan.

FT. WAYNE, IND.—The city of Fort Wayne plans to build a bridge over the St. Joseph river at State street costing $65,000.

INDIANAPOLIS. — The Shotwell Pump & Tank Co. has been incorporated with $60,000 capital by C. S. Shotwell, E. W. Harris and T. R. Lewis.

INDIANAPOLIS.—The Highway Tractor Co., which was recently incorporated, is making plans for a plant to cost $2,000,000. C. G. McCutcheon, of Detroit, and B. R. Parrott, of Jackson, Mich., are interested.

INDIANAPOLIS. — The Highway Tractor cialty Supply Co. has been incorporated to manufacture metal specialties with $25,000 capital by H. W. Robbins, A. P. Catlin and T. S. Catlin.

MADISON, IND.—The Tower Mfg. Co., manufacturer of rivets, tacks and other products, suffered a loss recently of $50,000 by fire.

MARION, IND.—Architect H. G. Bowstad, Glass building, is preparing plans for a building for the Koppan Mold Glass Co., which will cost about $20,000.

MITCHELL, IND.—The city of Mitchell will build a waterworks plant to cost $115,000. No equipment has been purchased.

RICHMOND, IND.—The Lorillard Co. plans additions to cost $75,000.

RICHMOND, IND. — Commissioners of Wayne county have appropriated $180,000 for a bridge at Main street and $185,000 for a birdge at South G street.

TERRE HAUTE, IND.—The Grasselli Chemical Co. is building a large plant which will be completed within one year and will represent an investment of $3,000,000. The main building is 250 x 800 feet.

WALKERTON, IND.—The C. R. Folsom Iron Works has been incorporated to manufacture tanks and oil supplies with $35,000 capital by O. C. Shockley, W. A. Endley and V. W. Hardenbrook.

ALTON, ILL.—The Beall Bros. Tool Co. has increased its capital stock from $150,000 to $300,000 and will build additions to its plant.

CHICAGO.—The Wahl Adding Machine Co. will build a 3-story factory, 125 x 175 feet.

CHICAGO.—E. R. Klemm, 1453 Austin avenue, will build a 2-story machine shop 24 x 156 feet, to cost $15,000.

CHICAGO.—A contract has been awarded by the Excelsior Steel Furnace Co. for a 4-story factory 130 x 150 feet, to cost $100,000.

CHICAGO.—The Automatic Screw Machine Products Co. will build a 1-story shop at 416 West Grand avenue.

CHICAGO. — The Sefton Mfg. Co., 1301 West Thirty-fifth street, will build a 1-story machine shop 60 x 180 feet, costing $50,000.

CHICAGO. — The Mayo-Skinner Mfg. Co. will build a plant on a site just purchased on Elston avenue. The firm manufactures automobile appliances.

CHICAGO.—The International Molding Machine Co. will build a 2-story addition at 2616 West Twelfth street.

CHICAGO.—Plans are being made for a 2-story steel and brick machine shop and foundry for the Octigan Drop Forge Co., 2430 Lowe avenue, costing $100,000.

CHICAGO.—The Chicago Malleable Castings Co., 1219 West 120th street, will build a 2-story addition costing $15,000. A. C. Coffin, 64 West Randolph street, is architect.

CHICAGO.—The Phoell Mfg. Co., screw manufacturer, has bought a site at Twelfth street and Waller avenue, and will build a 1-story factory costing $50,000. Mason Phelps is president.

CHICAGO.—The Industrial Mfg. Co., manufacturer of machine tools, will build a machine shop at 408 North Sacramento boulevard, costing $10,000. W. Granger, 36 West Randolph street, is architect.

CHICAGO.—The Riverside Foundry & Machine Works will build a machine shop, 42 x 132 feet to cost $12,000. Heimbeck & Bacon, 852 East Sixty-third street, are architects.

DIXON, ILL. — Plans are ready for a bridge over Rock river costing $100,000. Charles F. Nesbit is city engineer.

KANKAKEE, ILL. — The West Kankakee Stove Co. will build an addition costing $90,000.

PEORIA, ILL.—The Holt Mfg. Co. is preparing to build a foundry 200 x 300 feet to cost $100,000.

QUINCY, ILL.—The Stone Tractor Mfg. Co. has been incorporated with $100,000 capital to build tractors, by G. M. Stone, W. G. Brady and J. L. Fullton.

THORNTON, ILL. — The plant of the Brownell Improvement Co., manufacturer of stone-crushing machinery, was damaged fire recently.

FOND DU LAC, WIS.—The McClellan Refrigerating Machine Co. has been incorporated with $50,000 capital by A. Jens, J. E. Ramsey and J. W. Rosenbaum.

KENOSHA, WIS. — The Winther Motor Truck Co. is buying its equipment of machine tools for the plant which will be erected next spring. Martin P. Winther is president.

KILBOURN, WIS.—The Marshall Mfg. Co. has been incorporated to manufacture tools with $25,000 capital by F. A. Marshall, H. H. Bennett and C. M. Morris.

MILWAUKEE.—The Stegeman Motor Car Co. will build an addition costing $30,000.

MILWAUKEE.—The Chain Belt Co. is building an addition, 70 x 111 feet, at its plant on Muskego avenue.

MILWAUKEE.—The foundry and machine shop of the Filer & Shotwell Co. were burned recently with a loss of $200,000.

MILWAUKEE.—The Wisconsin Iron & Wire Works will build a factory at Booth and Becker streets, costing $22,000.

MILWAUKEE.—A permit has been issued to the Maynard Steel Casting Co., to erect a 1-story foundry addition, 84 x 85 feet in size at 716 Reed street.

MILWAUKEE.—The Kempsmith Mfg Co. is adding to its generating equipment. Vaughn & Meyer, Majestic building, Milwaukee, are in charge.

MILWAUKEE.—The Progressive Metal & Refining Co., 432 Barclay street, is building the first unit of its new plant, 40 x 160 feet, three stories, and this will be followed by the second unit, 80 x 160 feet.

MILWAUKEE.—The Davis Mfg. Co., internal combustion engines, has awarded contracts for the erection of a 1-story brick and concrete addition to the main machine shop. The new building is 144 x 225 feet. The steel

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CLEVELAND - - OHIO

work has been let to the Milwaukee Structural Steel Co. As soon as this improvement is completed, the Davis company plans to build a large addition to its foundry. Plans will be prepared at once.

MILWAUKEE.—The Allen-Bradley Co., 495 Clinton street, manufacturer of electric apparatus, has increased its capital from $25,000 to $136,000 and probably will enlarge its plant. H. L. Bradley is general manager.

MILWAUKEE.—The Davis Mfg. Co., manufacturer of internal combustion engines, will build a 1-story addition, 144 x 225 feet, to its main shop at Mitchell street and Fifty-seventh avenue. Addition to the foundry will be built later.

MILWAUKEE.—The Filer & Stowell Co., builder of engines and saw mill machinery, will build a 3-story machine and blacksmith shop and pattern storage house to replace the one burned last month. The new structure will cost about $350,000.

MILWAUKEE.—Architect Stanley F. Kadow, 988 Kinnickinnic avenue, has been engaged to prepare plans for a new foundry to be erected on the south side. Mr. Kadow is not at liberty to divulge the owners' names and says construction work will not begin until early spring. The dimensions will be 70 x 36 feet.

MILWAUKEE. — The Milwaukee Electric Crane & Mfg. Co. is being organized with $1,000,000 capital by a group of former officials and engineers of the Pawling & Harnischfeger Co. A plant will be built on a 7½-acre site on which are located several shops and foundries. The company will manufacture electric traveling cranes, hand cranes and hoists.

MILWAUKEE.—The Chicago, North Shore & Milwaukee railroad, electric interurban line, has purchased a half block of property at Clybourn, Sycamore, Fifth and Sixth streets, Milwaukee, for $200,000 and is preparing plans for car barns, repair shop, package freight and interurban passenger station. The building will be 150 x 270 feet. Work will begin after April 1.

RACINE, WIS. — The Walker Mfg. Co., automobile specialties, lifting jacks, etc., is installing many new tools and other equipment, thereby doubling its facilities.

STEVENS POINT, WIS. — The Worden-Allen Co., Milwaukee, has taken the contract fo rerecting a new building, 76 x 108 feet, 3-story and basement, for the Whiting-Plover Paper Co. The paper company also plans to install two new water wheels and several electric elevators.

WEST ALLIS, WIS. — The Sanitary Ice Co. contemplates the erection of a new plant for the manufacture of artificial ice as a cost of $30,000, including equipment. The building will be 50 x 100 feet.

WEST BEND, WIS.—The Gehl Bros. Mfg. Co., farm tractors, gas engines, etc., is installing additional punching, riveting and steel-pressing equipment.

ANN ARBOR, MICH.—G. S. Williams, engineer, Cornwell building, has completed plans and will invite bids soon for a hydro-electric power plant for the Detroit Edison Co., to be erected on the Huron river. The capacity will be 1,000 kilowatts; the cost $140,000.

BAY CITY, MICH.—The Commercial Body Co., recently incorporated, will build an automobile factory.

DETROIT.—The Hydraulic Hoist & Body Co. will build a 2-story factory 50 x 100 feet.

DETROIT.—The Michigan Wire Cloth Co., 500 Howard street, will build a factory costing $30,000.

DETROIT.—The Universal Car Equipment Co. has increased its capital from $50,000 to $100,000.

DETROIT.—The Arrow Tool & Reamer Co. has been incorporated to manufacture machine tools and supplies by Edward F. Griffith, John J. Kennedy and R. Mathieson Jr.

DETROIT. — The Williams Iron Co. has been incorporated to smelt and refine metals and ores with $200,000 capital by Thomas I. Cochran, J. M. Williams and H. E. Williams.

DETROIT. — The Gabriel Reinforcement Co., 1023 Penobscot building, will erect a factory costing $18,000 for the manufacture of reinforcing steel.

DETROIT.—The Lincoln Brass Works has been incorporated for the manufacture of brass goods with $15,000 capital stock by John O. Stevens and H. Ellison of Highland Park and E. H. Mueller, of Detroit.

DETROIT.—The Huron Tractor Co. Penobscot building, recently incorporated, will build a plant at Port Huron. R. R. Boyer is manager. Some additional equipment will be bought.

DETROIT.—The Detroit Valve & Fittings Co., E. B. Whitcomb, president, has authorized construction of additions to the company's plant at Wyandotte, which will double its capacity.

ECORSE, MICH.—The International Steel Tube & Rolling Mills has bought a site and will build a 50-ton tube mill. H. K. Flagler is president and general manager.

FLINT, MICH.—The Western-Mott Wheel Co. will build an addition costing $125,000.

GRAND RAPIDS, MICH.—The Pneumatic Tool Co. is erecting an addition, 109 x 209 feet.

GRAN DRAPIDS, MICH. — The Grand Rapids Grinding Machine Co. has been incorporated to manufacture grinding machines with $25,000 capital by Charles F. Hext, S. O. Livingston and J. DeKoning.

GRAND RAPIDS, MICH. — The Kellogg-Burlingame Co. has been incorporated to manufacture pumping and power-plant equipment, with $10,000 capital by Charles J. Davis of Lansing, M. V. Burlingame and Robert B. Kellogg, of Grand Ripids.

HAMTRAMCK, MICH.—The Michigan Steel Tube Co. will build a 1-story factory costing $40,000.

LANSING, MICH. — The Duplex Motor Truck Co. has acquired 15 acres on which to erect a manufacturing plant. Tentative plans call for a main building 60 x 800 feet. Administration buildings and general offices are also planned.

MUSKEGON, MICH.—The Lakey Foundry Co. will erect a modern foundry plant to be 200 x 310 feet, which will treble its present capacity for producing about 40,000 tons daily.

PONTIAC, MICH.—The Pontiac Tractor Co. has been incorporated to manufacture engines, tractors and sprayers with $42,000 capital, by Fred S. Welch, N. A. Wright and M. D. Hubbard.

NEW ULM, MINN.—Renville and Brown counties will receive bids soon for a bridge over the Minnesota river costing $10,000.

ST. PAUL.—The Equity Co-Operative Exchange, 209 Pioneer building, will build a 1,000,000-bushel addition to its elevator in the spring.

WADENA, MINN.—Bids will be received until Jan. 29 by Eugene Boss, county auditor, Wadena, for a steel bridge containing three 80-foot spans.

KANSAS CITY, MO.—The Brass & Metal Mfg. Co. will build an addition to its plant.

KANSAS CITY, MO.—The Sanitary Engineering & Mfg. Co. has been incorporated with $25,000 capital by William T. Campbell, F. R. Megan and S. B. Strother.

KANSAS CITY, MO. — The Double Drive Motor Co. has been incorporated to manufacture automobiles and tractors with $500,000 capital by Walter Beck, Theodore Ditmars and S. B. Gatewood.

ST. LOUIS.—The Jackes-Evans Mfg. Co., Main and Tyler streets, has obtained plans for a factory to cost $100,000.

ST. LOUIS.—The Aetna Spring & Ring Co. has been incorporated to manufacture motor vehicles and accessories with $12,000 capital by S. E. Ellman, M. A. Jenkins and J. F. Jenkins.

WARRENSBURG, MO.—Bids will be received until Jan. 16 on 16 steel bridges.

BOONE, IA.—Boone county plans to build a 60-foot pony truss bridge and a 70-foot skew pony truss bridge. J. A. Illeman, of Boone, is county engineer.

CEDAR RAPIDS, IA.—The Holland Furnace Co., Holland, Mich., will establish a factory in Cedar Rapids. The main building will be 160 x 400 feet. Another building is planned which will be 40 x 75 feet.

CENTERVILLE, IA. — The Centerville Light & Traction Co. will build a power plant to increase its horsepower from 2,000 to 5,000.

DES MOINES, IA.—The city plans to build reinforced concrete bridges in 1917 to the extent of $400,000.

DUBUQUE, IA.—The Farley & Loetscher Mfg. Co. plans to build a 7-story factory 100 x 256 feet.

HUMBOLDT, IA.—Humboldt county is making plans for a 65-foot and a 70-foot pony truss bridge. L. D. Snyder, of Dakotah, is county engineer.

KNOXVILLE, IA.—W. O. Price, county engineer, Knoxville, will receive bids until January 18 on a pony truss bridge to cost $5,800, requiring about 150 tons of steel.

MANCHESTER, IA.—The National Mfg. Co. has been incorporated to manufacture farm implements and steel gates with $50,000 capital by H. M. Bradley, A. M. Cloud and C. G. Yoran.

WATERLOO, IA.—The W. Galloway Co., manufacturer of agricultural implements, will build a factory.

South of Mason-Dixon Line

ALEXANDRIA, VA.—Southern railroad has let a contract for the erection of a shop and storehouse here.

NORFOLK, VA.—Plans are in progress for a 1 and 2-story, 150 x 500-foot machine shop and electrical shop, to cost about $500,000, and for a 1 and 2-story foundry, 225 x 500-foot, to cost $500,000, to be added to the navy yard here.

BIRMINGHAM, ALA. — Bids will be received soon for a reinforced concrete viaduct at Twenty-first street to cost $100,000. J. M. Hendrick is city engineer.

JOHNSON CITY, TENN.—The Tennessee Lumber & Veneer Corporation is asked for prices on equipment, rebuilt, including veneer clippers, veneer lathe 100-inch dryer and 7-foot band sawmill.

CHARLESTON, MISS. — The Charleston Cooperage Co. has been incorporated with $50,000 capital by W. E. Burke and G. E. Lamb.

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A Partial List of Users

American Car & Foundry Company
Buick Motor Company
Budd Wheel Corporation
Cadillac Motor Car Company
Chevrolet Motor Co. (6 Plants)
Cleveland Foundry Company
Dort Motor Car Company
Frantz Premier Company
Lloyd Mfg. Company
Michigan Stamping Company
Ohio Carriage Company
Studebaker Corporation
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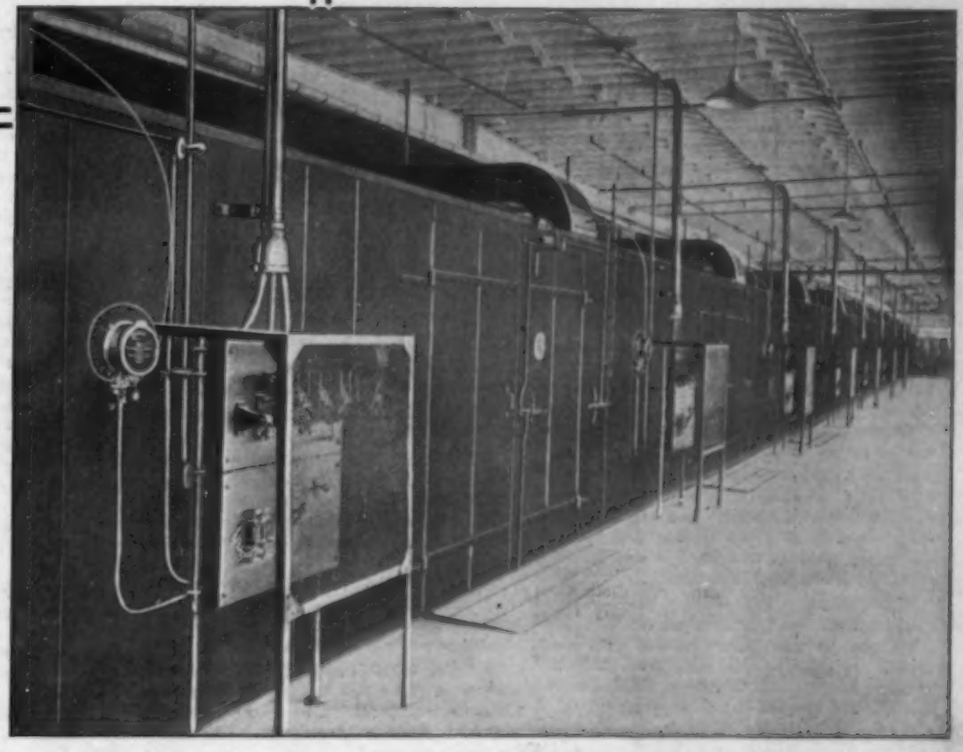

This illustration shows one of fifteen Batteries of Ovens in the Plant of the *Willys-Overland Company, Toledo, Ohio*. It is the largest existing installation.

YOUNG BROTHERS COMPANY

Russel and Franklin Streets
DETROIT, MICH.

VINTON.—Bids will be received about April 1 for a waterworks system, including a 500-gallon power driven pump and a 50,000-gallon tank on a 100-foot tower, costing about $25,000. T. H. Mandell, Lake Charles, is engineer.

GAINESVILLE, TEX.—The city of Gainesville is planning to build a bridge costing $50,000.

HOUSTON, TEX.—A contract will be let soon for an auxiliary water plant on the south side costing $100,000. D. Fitzgerald is superintendent.

LOCKNEY, TEX.—H. E. Elrod, engineer, Dallas, has been retained to prepare plans for a waterworks system costing $25,000.

PORT ARTHUR, TEX.—Bonds for $180,000 have been sold for waterworks and sewer extensions.

WICHITA FALLS, TEX.—Bonds for $80,000 have been sold by the county for bridge work.

Mississippi to the Rockies

CALDWELL, KAS. — An election will be held Jan. 23 to vote on an appropriation of $80,000 for waterworks and electric light plants. Burns & McDonnell, Kansas City, Mo., are engineers.

KANSAS CITY, KAS.—The Missouri Pacific railroad is preparing to build a bridge 1,500 feet long at the mouth of the Kaw river.

NORFOLK, NEB.—The Albough-Dover Co., Twenty-first street and Marshall boulevard, has awarded contracts for a tractor engine plant at Norfolk.

OMAHA, NEB.—P. Melchiors & Sons Co. has been incorporated with $25,000 capital to manufacture and repair machinery.

YUTAN, NEB.—Commissioners of Douglas and Saunders counties will build a bridge over the Platte river cosing $98,000.

GREAT FALLS, MONT.—Great Northern railroad will spend about $200,000 for additions to its yards here and about $300,000 on new shops.

HARDIN, MONT.—Big Horn county is planning to build a bridge over the Big Horn river costing $37,000. J. E. Graham is county engineer.

RONAN, MONT.—The city of Ronan plans to build a waterworks plant and four miles of mains. E. D. Covell is engineer.

ELKO, NEV.—Plans are being made for a waterworks system costing $200,000. Lewis C. Kelsey, Portland, Ore., is engineer.

RENO, NEV.—The Nevada Engineering & Supply Co. will build additions to its foundry and machine shops G. Wingfield is president.

OKMULGEE, OKLA.—The United Iron Works will build a machine and boiler shop costing $15,000.

OGDEN, UTAH.—The Western Foundry & Machine Co. will build a foundry costing $10,000.

COLORADO SPRINGS, COLO. — Surveys have been made for a waterworks system to cost about $500,000. George P. Anderson, Los Angeles, is engineer.

COLORADO SPRINGS.—An election will be held soon on issuing $500,000 in bonds for a waterworks system. G. P. Anderson, of Los Angeles, is engineer.

TRINIDAD, COL.—The city of Trinidad has sold $28,000 worth of bonds for a waterworks system. W. R. Lewis is superintendent.

DOUGLAS, WYO.—Bids have been asked by H. S. Datesman, city clerk, for centrifugal pumps for the municipal waterworks.

JONESBORO, ARK.—The Williams Rotary Ditching Machine Co. is planning to build a factory costing $100,000.

LITTLE ROCK, ARK.—R. M. Pearson will build a machine shop 50 x 140 feet and will require equipment costing $10,000.

The Dominion of Canada

MONTREAL. — The Dominion Iron & Wrecking Co. has been incorporated with $50,000 capital to manufacture locomotives, engines, iron, steel, machinery, etc., by Frank J. Charman, Isaac C. Gaskell, Lewis H. Cohen and others all of Montreal.

MONTREAL.—The Francis Hankin & Co. have been incorporated with $45,000 capital to manufacture machinery, iron, steel, metals, tools, etc., by Francis Hankin and Charles Champoux, both of Montreal; Alfred H. Hill, of St. Lambert, Que., and others.

MONTREAL. — The Metal Foundries, of Canada, Ltd., has been incorporated with $50,000 capital to manufacture metals, iron, steel, machinery, etc., by John M. Duff, 157 Bay street; James G. Hamilton, Marjorie L. Chamberlain and others, all of Toronto.

HAMILTON, ONT. — The plant of the National Machinery & Supply Co., manufacturers of munitions, sustained damage by fire on Jan. 4 to the amount of $20,000.

LONDON, ONT.—Beatty Bros. will erect a foundry to cost $30,000.

OTTAWA, ONT. — Capital Machinists & Founders Co. has been incorporated, to carry on business as machinist, engineer and founder with $50,000 capital by Michael J. Skelly, Walker L. Goode and Ephriam P. McGill, of Ottawa.

OWEN SOUND, ONT.—The Corbet Foundry & Machine Co. is in the market for a 10-horsepower electric motor suitable for hydro power for immediate delivery.

OWEN SOUND, ONT. — Northern Bolt Screw & Wire Co. has been incorporated to manufacture nails, bolts, screws, wire and kindred products, tools and machinery with $500,000 capital by John McEwen, Clarence L. Vanwyck and James H. Van Overbeek, Owen Sound.

PEMBROKE, ONT. — The Pembroke Machinery Co. has been incorporated to do a general foundry and machine business with $100,000 capital by Edward A. Dunlop, James F. Muiro, of Pembroke, George J. Bryson, of Ottawa, et al.

PORT ARTHUR, ONT.—Port Arthur Ship Building Co. has been incorporated as ship builder with $2,500,000 capital by Donald R. Hossack, John G. Leckie, Donald B. Sinclair and others, of Toronto.

TORONTO, ONT.—The Wagner Chambers Glassco Co. has been incorporated with $49,000 capital to manufacture munitions, etc., by Wm. E. Wagner and James L. Chambers, of Toronto and Ernest S. Glassco, of Oakville.

WINDSOR, ONT. — The St. Louis Auto Machinery Co. has been incorporated to manufacture automobiles, engines and conveyances of all kinds with $40,000 capital by Joseph B. St. Louis, Catherine Northwood and Joseph F. Knight, of Windsor.

PEACE RIVER, ALTA. — Tenders have been called for the building of a steel railroad bridge 1,600 feet long across the Peace river, the approximate cost of which will be $1,000,000.

New Catalogs

PLANERS. — The Cincinnati Planer Co., Cincinnati, has brought out a 9 x 12-inch catalog describing planers. The construction of the oiling devices, housings, cross rails and taper gibs are described and illustrated in the first 10 pages. The following 30 pages are devoted to full page illustrations of the several types of Cincinnati planers together with brief specifications for each type of machine. Planer chucks, centers and tools are described in the three following pages and the rest of the book, four pages, is devoted to suggestions pertaining to the erection and maintenance of machines built by the Cincinnati company.

PIPE MACHINES. — The Williams Tool Co., Erie, Pa., has recently issued to the trade a well-illustrated catalog in which the various kinds of pipe working machines are described. The Williams Tool Co., in addition to manufacturing pipe machines, builds a wide line of cutting off machines and feed water heaters, but descriptions of the two last named products are not included in the catalog. The book is unusual in that a complete table of extras, list of standard equipment and table of dimensions accompanies a general description of each type of machine. These descriptions are further augmented by the addition of a full page illustration of small repair parts for each machine. Each of the parts is numbered and a keyed index of the part name corresponding to the number on the illustration, makes identification certain and easy.

RIVETING HAMMERS. — The Ingersoll-Rand Co., New York, has published a bulletin describing its line of riveting hammers. The handle of the hammer is a drop forging, containing two small projecting wings, one on each side to prevent the operator's hand from slipping. A coat of lacquer prevents rusting. The handle is attached to the cylinder by means of two bolts, on the side of and parallel to the cylinder. In accordance with the safety first laws, the Ingersoll-Rand Co. has equipped all of its riveters with safety retainers. In order to show the divergent line to which the riveter may be adapted, photographs have been reproduced showing it at work on boilers, girders, steel skeletons for public buildings, automobile axles, steel pipes, etc.

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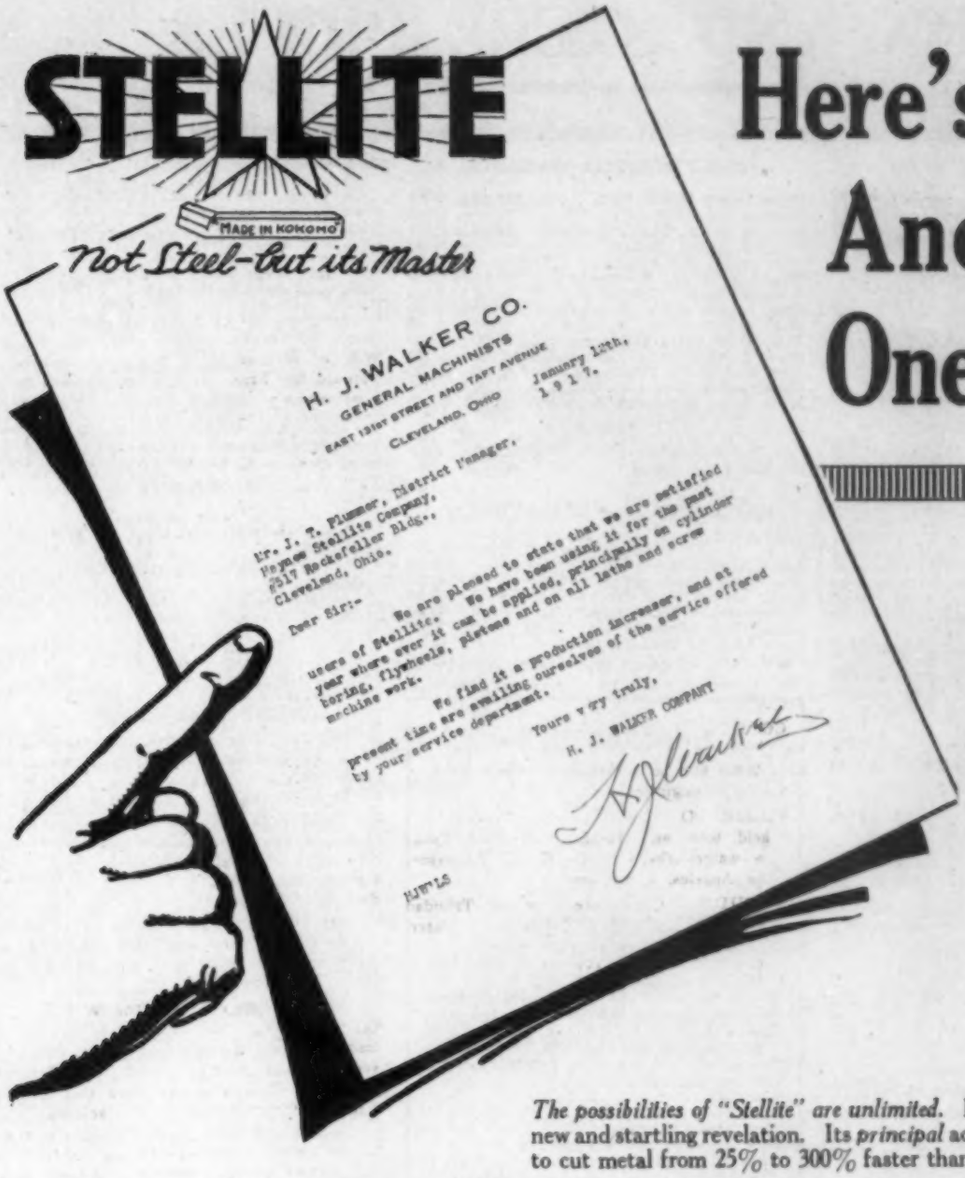
H. J. WALKER CO.
GENERAL MACHINISTS
EAST 131st STREET AND TAFT AVENUE
CLEVELAND, OHIO
January 12th, 1917.
Mr. J. T. Plumer, District Manager,
Haynes Stellite Company,
517 Rockefeller Bldg.,
Cleveland, Ohio.
Dear Sir:-
We are pleased to state that we are satisfied users of Stellite. We have been using it for the past year where ever it can be applied, principally on cylinder boring, flywheels, pistons and on all lathe and screw machine work.
We find it a production increaser, and at present time are availing ourselves of the service offered by your service department.
Yours very truly,
H. J. WALKER COMPANY
HJWLS

The letter to the left is an illustration of just how *Stellite* stands among big users.

We have on file, hundreds of similar letters of commendation from users of *"Stellite"*.

The possibilities of "Stellite" are unlimited. Each day brings in a new and startling revelation. Its *principal* advantage is its ability to cut metal from 25% to 300% faster than can any other tool.

ARC WELDED STELLITE TOOLS

are the latest thing that we have produced.

These tools are not all "Stellite"—only the part that does the actual cutting. The shank is made of drop forged .45 to .55 carbon steel.

Consequently Arc Welded Stellite Tools are so reasonable in price that they will pay for themselves the first day you use them.

Cut out the coupon below, send it along with your check for one dollar, and we will see that you get two 3/8" x 3/8" x 2" Stellite lathe bits. You will find that your dollar has been well invested.

The Haynes Stellite Company

Patentees and Sole Manufacturers

HOME OFFICE AND PLANT - KOKOMO, INDIANA

BRANCH OFFICES:

900 Lytton Building, Chicago, Ill. 120 Broadway, New York City, N.Y.
2402 Union Central Bldg., Cincinnati, O. 517 Rockefeller Bldg., Cleveland, O.
1370 Penobscot Bldg., Detroit, Mich. 805 Widener Bldg., Philadelphia, Pa.
2418 Farmers' Bank Bldg., Pittsburgh, Pa.

also sold by

THE MIDVALE STEEL COMPANY

WAREHOUSES: Philadelphia, Boston, New York, Cleveland, Chicago, San Francisco

Licensed Canadian Manufacturer

DELORO SMELTING AND REFINING CO.

DeLoro and Montreal, Canada

The Haynes Stellite Co.
Kokomo, Indiana

Gentlemen:

I have enclosed the One Dollar Bill. Please send me the Two Bits—so that I can give "Stellite" a trial.

Name .....

Address Care of .....

Street and City .....

I. T. R.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

Bessemer valley	$35.00
Bessemer, Pittsburgh	35.95
Basic, Pittsburgh	30.95
Basic, eastern Pa.	30.50 to 31.00
Basic, Buffalo	35.00
Malleable, Pittsburgh	31.95 to 33.95
Malleable foundry, Chicago	30.00 to 31.00
Malleable foundry, Philadelphia	32.00 to 33.00
Malleable foundry, Buffalo	35.00
No. 1X foundry, Philadelphia	31.00 to 31.50
No. 2 foundry, Pittsburgh	31.95 to 33.95
No. 2 foundry, Cleveland	30.30 to 31.30
No. 2 foundry, Ironton	30.00
No. 2 foundry, Chicago	30.00 to 31.00
No. 2X foundry, Philadelphia	30.00 to 31.00
No. 2X foundry, N. J. tidewater	30.00 to 31.00
No. 2X foundry, Buffalo	35.00
No. 2 plain, Philadelphia	29.50 to 30.00
No. 2 plain, N. J. tidewater	29.50 to 30.00
No. 2 plain, Buffalo	35.00
No. 2 southern, Birmingham	23.00 to 25.00
No. 2 southern, Cincinnati	25.90 to 27.90
No. 2 southern, Chicago	27.50 to 28.00
No. 2 southern, Phila. delivery	28.00 to 30.00
No. 2 southern, Cleveland	27.50 to 29.00
No. 2 southern, New York docks	28.25 to 30.25
No. 2 southern, Boston docks	28.00 to 30.00
No. 2 south. interior, New Eng.	29.00 to 31.00
No. 2 southern, St. Louis	
Virginia, No. 2X furnace	26.00 to 28.00
Virginia, No. 2X, Philadelphia	28.75 to 30.75
Virginia, No. 2X, Jersey City	29.00 to 31.00
Virginia, 2X, Boston points	29.25 to 31.25
Gray forge, eastern Pa.	29.00 to 29.50
Gray forge, Pittsburgh	30.95
Gray forge, Birmingham	22.00
Silveries, 8 per cent, furnace	36.00 to 37.00
Silveries, 8 per cent, Chicago	38.50
Low phos. Standard, Phila.	55.00 to 57.00
Low phos. Lebanon, Pa., furnace	50.00 to 55.00
Low phos., Pittsburgh	50.00 to 51.00
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	33.75 to 34.75
Charcoal, Buffalo	24.00 to 27.00
Charcoal, Birmingham	26.00 to 27.00

IRON ORE

Lake Superior Ores.
(Lower Lake Ports.)

Old range Bessemer, 55 per cent, ton	5.95
Mesabi Bessemer, 55 per cent, ton	5.70
Old range non-Bes., 51½ per cent, ton	5.20
Mesabi non-Bess., 51½ per cent, ton	5.05

Port Henry Ores.
(Per unit delivered eastern Pa.)
(All non-Bessemer.)

Old Bed, crude, 58 per cent	10.50c to 11.00c
Old Bed, concent., 65 per cent.	11.00c to 11.50c
Harmony concent., 63 per cent.	11.50c to 11.75c
Lump (at mines)	$5.75

Foreign Ores.
(Per unit, Philadelphia.)

Foreign Bess., 50 to 65 per cent	nominal
For'n non-Bess., 50 to 65 per cent	nominal

COKE

(At the ovens.)

Connellsville furnace	$9.50
Connellsville furnace, contract	8.00
Connellsville foundry, contract	6.50 to 6.75
Connellsville foundry	10.00 to 11.00
Wise county furnace, contract	5.00 to 5.50
Wise county foundry, contract	6.50 to 7.50
Pocahontas foundry, contract	6.00 to 7.50
Pocahontas furnace, contract	5.00 to 5.50
New River foundry, contract	6.25 to 7.75
New River furnace, contract	5.25 to 5.75

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, seaboard, or delivered prompt	$175
Ferro manganese, 80 per cent, seaboard, or delivered, contract	164 to 175
Spiegel, 20 per cent, fur. early and last half	55.00 to 60.00
Ferro-silicon, 50 per cent, Pbgh.	$150.00

Bessemer ferro-silicon, 9 per cent to 10 per cent, $4100; 10 to 11 per cent, $42.00; 11 to 12 per cent, $43.00; 12 to 13 per cent, $44.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$55.00 to 60.00
Forging billets, Phila.	75.00 to 85.00
Forging billets, Pbgh., nominal	75.00 to 85.00
Forging billets, Chicago	70.00
Wire rods, Pittsburgh	75.00 to 80.00
Bessemer billets, Youngstown	60.00 to 65.00
Bessemer billets, Pittsburgh	60.00 to 65.00
Open hearth billets, Pittsburgh	60.00 to 65.00
Open hearth billets, Youngstown	60.00 to 65.00
Bess. sheet bars, Youngstown	60.00 to 65.00
Op. h'th sheet bars, Youngstown	60.00 to 65.00
Bess. sheet bars, Pittsburgh	60.00 to 65.00
Open hearth sheet bars, Pbgh.	60.00 to 65.00
Muck bars, Pittsburgh (nominal)	50.00

SKELP

Grooved steel skelp	3.00c to 3.10c
Sheared steel skelp	3.50c to 3.60c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bess. rails, Pbgh. & Chgo.	$38.00
Stan. op-h'th rails, Pbgh. & Chgo.	40.00
Light rails, 8 to 10 lbs., Pbgh.	53.00
Light rails, 8 lb., Chicago	49.00
Light rails, 12 to 14 lbs., Pbgh.	52.00
Light rails, 12 lbs., Chicago	47.00
Light rails, 16 to 20 lbs., Pbgh.	51.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York ad Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

Light rails, 16 to 20 lbs., Chgo.	$46.00
Light rails, 25 to 45 lbs., Pbgh.	50.00
Light rails, 25 to 45 lbs., Chgo.	45.00
Relaying rails, standard, Pbgh. and Chicago	$33.00 to 34.00
Relaying rails light, Chicago	34.00 to 35.00
Angle bars, st. sect., Pbgh. base	2.25c to 2.75c
Angle bars, st. sections, Chgo.	2.25c to 2.75c
Spikes, railroad, Pittsburgh	3.40c
Spikes, railroad, Chicago	3.50c
Track bolts, Pittsburgh	4.50c to 5.00c
Track bolts, Chicago	4.25c to 4.50c
Tie plates, Chicago	$55.00 to 60.00

SHAPES, PLATES AND BARS

Structural shapes, con. Pbgh.	3.10c
Structural shapes, Pbgh.	3.10c to 3.25c
Structural shapes, Philadelphia	3.159c to 3.659c
Structural shapes, Chicago	3.19c to 3.75c
Structural shapes, New York	3.169c to 3.669c
Tank plates, Chicago	3.79c to 4.25c
Tank plates, Pittsburgh (con).	3.60c to 4.00c
Tank plates, Pittsburgh	4.50c to 5.00c
Tank plates, Philadelphia	3.909c to 4.659c
Tank plates, New York	3.919c to 4.669c
Bars, soft steel, Chicago	3.09c to 3.50c
Bars, soft steel, Pbgh. (con.)	3.00c
Bars, soft steel, Pittsburgh	3.00c to 3.25c
Bars, soft steel, New York	3.169c to 3.419c
Bars, soft steel, Philadelphia	3.159c to 3.409c
Hoops, carloads, Pbgh. contr.	3.50c
Hoops, Pbgh.	4.00c to 4.25c
Bands, Pittsburgh	3.90c to 4.10c
Bands, Pittsburgh (contr.)	3.00c
Shafting, Pbgh., contr. carloads	10 to 20 off
Bar iron, Chicago	3.00c
Bar iron, Philadelphia	3.159c
Bar iron, Cleveland	3.00c
Bar iron, New York	3.159c
Bar iron, Pittsburgh	3.25c
Hard steel bars, Chicago	3.00c

SHEETS

(In cents per pound).
(Open hearth material takes 10c above prices of bessemer.)

SHEET MILL BLACK.

Gage.	Bessemer.
17 to 21	4.30 to 5.30
22 to 24	4.35 to 5.35
25 and 26	4.40 to 5.40
27	4.45 to 5.45
28	4.50 to 5.50
29	4.55 to 5.55
30	4.65 to 5.65

TIN MILL BLACK.

Gage.	Bessemer.
15 and 16	4.30 to 5.30
17 to 21	4.35 to 5.35
22 to 24	4.40 to 5.40
25 to 27	4.45 to 5.45
28	4.50 to 5.50
29 and 30	4.55 to 5.55
30½ and 31	4.60 to 5.60

GALVANIZED.

Gage.	Bessemer.
10 and 11	5.50 to 6.50
12 to 14	5.60 to 6.60
15 and 16	5.75 to 6.75
17 to 21	5.90 to 6.90
22 to 24	6.05 to 7.05
25 and 26	6.20 to 7.20
27	6.35 to 7.35
28	6.50 to 7.50
29	6.70 to 7.70
30	6.90 to 7.90

BLUE ANNEALED.

Gage.	Bessemer.
3 to 8	4.25 to 4.75
9 to 10	4.25 to 4.75
11 to 12	4.25 to 4.75
13 and 14	4.25 to 4.75
15 and 16	4.25 to 4.75

No. 28 black, Chicago	4.69c
No. 28 galvanized, Chicago	6.50c to 6.75c
No. 10 blue annealed, Phila.	4.159c to 4.659c
No. 10 blue annealed, Chicago	4.69c

TIN PLATE

Tin plate, 100 lb., coke base	7.00c to 8.00c
Terne plate	5.75c

IRON AND STEEL PIPE

(Prices adopted Dec. 30, 1916.)

Steel. Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛, ¼ and ⅜, butt	57	30½
½, butt	61	46½
¾ to 3, butt	64	50½
2, lap	57	44½
2½ to 6, lap	60	47½
7 to 12, lap	57	43½
13 and 14, lap	47½	....
15, lap	45	....

Iron. Standard weight, threads and couplings, diam. in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ and ¼, butt	46	19
⅜, butt	47	20
½, butt	51	33
¾ to 1½, butt	54	38
1¼, lap	40	25
1½, lap	46	32
2, lap	47	33
2½ to 6, lap	49	36
7 to 12, lap	48	35

BOILER TUBES

(Price adopted Nov. 20, 1916.)

Steel, 3½ to 4½ inches l. c. l.	46
Iron, 3½ to 4½ inches l. c. l.	36

IRON AND STEEL PRICES

Corrected up to Tuesday noon

WIRE PRODUCTS

(Adopted Nov. 24, 1916.)
(Retailers' price 5 cents above jobbers' quotations.)

Wire nails, jobbers', Pittsburgh	$3.00
Coated nails	3.10 to 3.15
Plain wire, jobbers', Pittsburgh	2.95
Galvanized wire, jobbers', Pbgh	3.65
Polished staples, Pbgh	3.15
Galvanized staples, Pbgh	3.85
Bard wire, painted, jobbers', Pbgh.	3.15
Barb wire, galv., jobbers,' Pbgh	3.85

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled thread, 40 and 10; cut threads, 40 and 2½, larger or longer, 30 and 5.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter rolled 50; cut, 40 and 10; larger or longer, 35 and 5.

Cold pressed, semi-finished hexagon nuts, 50, 10 and 5.

Gimlet and cone point lag bolts, 50. Hot pressed square nuts, blanks, $2.50 off; tapped $2.30 off. Hot pressed hexagon nuts, blank, $2.50 off; tapped, $2.30 off.

Cold pressed square nuts, blank, $2.10 off; tapped, $1.90 off. Cold pressed hexagon nut, blank, $2.25 off; tapped, $2.00 off.

RIVETS

Structural rivets, Pbgh	4.25c
Boiler rivets, Pbgh	4.35c
Tinner's rivets, 40 and 10 off, Pittsburgh.	

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	3.00c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil	6.00c

COLD ROLLED STRIP STEEL

Base price, 7.00c per 100 pounds, hard, coils 1½ inches and wider and by .100 inch and heavier.

CAST IRON WATER PIPE

Four-inch, Chicago	$44.00 to 45.00
Six-inch and larger, Chicago	41.00 to 42.00
Six-inch Class B, New York	41.50
Four-inch Class B, New York	44.50
Four to six-inch Birmingham	39.00
Six-inch and larger, Birmingham.	36.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	3.75c
Steel squares, 2-in. & ov., Cleve.	4.35c
Steel rounds, 2-in & ov., Cleve.	4.25c
Steel bars, und. 2 in., Cleveland.	3.85c
Steel bars, Detroit	3.70c
Steel bars, Philadelphia	3.75c
Steel bars, New York	3.85c
Steel bars, St. Louis	3.80c
Steel bars, Cincinnati	3.80c to 4.35c
Steel bars, St. Paul	3.85c
Steel bars, over 2-in., Buffalo	4.50c
Steel bars, Buffalo	3.85c
Iron bars, Chicago	3.75c
Iron bars, Cleveland	3.80c
Iron bars, Detroit	3.70c
Iron bars, St. Louis	3.75c
Iron bars, Cincinnati	3.80c to 4.35c
Iron bars, Philadelphia	3.50c
Iron bars, New York	3.75c
Shapes, Chicago	3.85c
Shapes, Detroit	3.90c
Shapes, St. Louis	3.90c
Shapes, St. Paul	3.95c
Shapes, New York	3.95c
Shapes, Cleveland	3.95c
Shapes, Philadelphia	3.75c
Shapes, Buffalo	3.95c
Shapes and plates, Cincinnati	3.90c to 4.60c
Plates, Chicago	4.50c
Plates, Detroit	4.75c
Plates, St. Louis	4.55c
Plates, St. Paul	4.60c
Plates, New York, wide	5.00c
Plates, New York, narrow	4.75c
Plates, Cleveland	4.60c
Plates, Philadelphia	4.50c to 5.00c
No. 10 blue anl. sheets, Chicago	4.65c
No. 10 blue anl. sheets, Cleve.	4.50c
No. 10 blue anl. sheets, Cleveland	4.75c
No. 10 blue anl. sheets, Buffalo.	4.50c
No. 10 blue anl. sheets, St. L.	4.70c
No. 10 blue anl. sheets, Cinci.	4.60c
No. 10 blue anl. sheets, St. Paul	4.75c
No. 10 blue anl. sheets, Detroit.	4.75c
No. 28 black sheets, Chicago	5.15c
No. 28 black sheets, Cleveland.	5.50c
No. 28 black sheets, Cincinnati.	4.75c
No. 28 black sheets, Detroit	5.25c
No. 28 black sheets, St. Louis.	5.30c
No. 28 black sheets, St. Paul	5.25c
No. 28 galv. sheets, Chicago	7.00c
No. 28 galv. sheets, Cleveland	7.00c
No. 28 galv. sheets, Cincinnati	7.00c
No. 28 galv. sheets, Detroit	7.25c
No. 28 galv. sheets, St. Louis	7.50c
Hoops, Cleveland	4.75c
Hoops, Detroit	4.50c

Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.75 to 2.00
Solvent naphtha	.25

Per Pound at Producers Plant.

Phenol	$0.50 to .55

Per 100 Pounds at Seaboard.

Sulphate of ammonia	$4.12 to 4.15

Contract.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.25

Per Pound at Producers Plant.

Phenol (nominal)	$0.55

Per 100 Pounds at Seaboard.

Sulphate of ammonia (nearby)	$4.12 to 4.15

IRON AND STEEL SCRAP

(Net Tons.)

Angle bars, iron, Chicago	$26.50 to 27.00
Angle bars, steel, St. Louis	19.00 to 19.50
Arch bars and transoms, St. L.	28.00 to 28.50
Arch bars and transoms, Chgo.	27.00 to 27.50
Cast, No. 1, St. Louis	15.00 to 15.50
Boiler plate, cut, No. 1, Chgo.	13.00 to 13.50
Boiler plate, cut, No. 1, St. L.	14.00 to 14.50
Boiler punchings, Chicago	20.00 to 21.00
Bundled sheet, Cincinnati	12.50 to 13.00
Busheling, No. 1, Chicago	16.50 to 17.00
Busheling, No. 1, Cincinnati	14.00 to 14.50
Busheling, No. 1, Cleveland	18.00
Busheling, No. 1, St. Louis	16.50 to 17.00
Busheling, No. 2, Chicago	12.25 to 12.75
Cast borings, Cincinnati	7.50 to 8.00
Cast borings, Cleveland	9.25 to 9.50
Cast borings, St. Louis	8.50 to 9.00
Cast borings, Chicago	8.00 to 8.50
Cast, No. 1, Chicago	15.50 to 16.00
Cast, No. 1, Cincinnati	15.50 to 16.00
Cast, No. 1, Cleveland	18.00 to 18.25
Cast, No. 1, St. Louis	16.00 to 16.50

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	83.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Cut forge, Chicago	22.00 to 22.50
Grate bars, Cleveland	12.00 to 12.50
Iron axles, St. Louis	33.50 to 34.00
Iron axles, Cleveland	44.00 to 45.00
Knuckles, coup., Chicago	23.00 to 23.50
Knuckles, coup., St. Louis	23.00 to 23.50
Locomotive tires, Chicago	29.00 to 29.50
Locomotive tires, St. Louis	26.00 to 26.50
Machine shop turnings, Chicago	9.00 to 9.50
Machine shop turnings, Cleveland	9.00 to 9.25
Machine shop turn'gs, Cincinnati	7.00 to 7.50
Machine shop turnings, St. Louis	8.50 to 9.00
Malleable agricultural, Chicago	15.00 to 15.50
Malleable agricultural, St. Louis.	16.00 to 16.50
Malleable, Cincinnati	12.50 to 13.00
Malleable railroad, Chicago	17.50 to 18.00
Malleable railroad, St. Louis	16.50 to 17.00
Pipes and flues, Cleveland	15.00 to 15.75
Pipes and flues, Chicago	13.50 to 14.00
Pipes and flues, St. Louis	14.00 to 14.50
Railroad wrought, No. 1, Cleve.	25.00 to 25.50
Railroad wrought, No. 1, Chgo.	23.00 to 23.50
Railroad wrought, No. 1, Cinci.	19.00 to 20.00
Railroad wrought, No. 1, St. L.	22.00 to 22.50
Railroad wrought, No. 2, Chgo.	22.00 to 22.50
Railroad wrought, No. 2, St. L.	21.50 to 22.00
Shafting, St. Louis	24.50 to 25.00
Springs, Chicago	24.00 to 24.50
Steel car axles, St. Louis	37.50 to 38.00
Steel car axles, Chgo.	35.00 to 36.00
Stove plate, Chicago	11.00 to 11.50
Stove plate, Cleveland	12.25 to 12.75
Stove plate, Cincinnati	10.50 to 11.00
Stove plate, St. Louis	12.00 to 12.50

(Gross Tons.)

Axle turnings, Cleveland	$16.50 to 16.75
Axle turnings, Buffalo	17.50 to 18.00
Busheling, No. 1, Buffalo	21.50 to 22.00
Busheling, No. 1, Pittsburgh	16.50 to 17.25
Busheling, No. 2, Buffalo	15.00 to 15.50
Bundled sheets, Pittsburgh	16.00 to 16.50
Bundled sheets, Cleveland	14.50 to 15.00
Bundled sheets, Buffalo	15.00 to 16.00
Bundled tin, Buffalo	15.00 to 16.00
Car wheels, (iron), Pittsburgh	21.00 to 22.00
Car wheels, (steel), Pittsburgh	28.00
Car wheels, Chicago	20.00 to 20.50
Car wheels, eastern Pa	21.00 to 22.00
Car wheels, Buffalo	23.00 to 24.00
Car wheels, New York	19.00 to 20.00
Car wheels, St. Louis	21.50 to 22.00
Car wheels, Birmingham	19.00 to 20.00
Car wheels, Cleveland	19.00 to 19.50
Tram car wheels, Birmingham	17.00 to 18.00
Cast borings, New York	11.50 to 12.00
Cast borings, eastern Pa	13.50 to 14.00
Cast borings, Buffalo	11.50 to 12.00
Cast borings, Pittsburgh	12.00 to 12.50
Cast, No. 1, eastern Pa	20.50 to 21.00
Cast, No. 1, Pittsburgh	20.00 to 21.00
Cast, No. 1, Birmingham	19.00 to 20.00
Cast, heavy, No. 1, N. J. points.	20.00 to 20.50
Forge, No. 1, eastern Pa	16.50 to 17.50
Frogs, switches, guards, St. L.	21.00 to 21.50
Grate bars, Buffalo	15.50 to 16.00
Grate bars, N. J. points	15.00 to 15.50
Heavy axle turnings, Buffalo	15.00 to 15.50
Heavy melting steel, Pittsburgh	23.00 to 24.00
Heavy melting steel, Buffalo	26.00 to 27.00
Heavy melting steel, Chgo	20.50 to 21.00
Heavy melting steel, Cleveland	22.00 to 22.50
Heavy melting steel, Cincinnati	19.00 to 20.00
Heavy melting steel, eastern Pa.	21.50 to 22.50
Heavy melting steel, New York	19.50 to 20.00
Heavy melting steel, St. L.	21.50 to 22.00
Heavy melting steel, Birmingham	21.00 to 22.00
Hydraulic pressed sheet, Cleveland	17.50 to 18.00
Hydraulic pressed sheets, Pbgh.	18.50 to 19.00
Hydraulic pressed sheets, Chgo.	14.50 to 15.00
Iron rails, Chicago	27.50 to 28.00
Iron rails, Buffalo	25.00 to 26.00
Iron rails, Cincinnati	24.00 to 25.00
Iron rails, St. Louis	27.00 to 27.50
Iron rails, Cleveland	29.00
Iron axles, Pittsburgh	39.00 to 40.00
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